METRICATION AND THE ASSESSMENT DIVISION

A Report on Conversion Capability
and Implications.

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Prepared by:

Ministry of Revenue
The Assessment Division
The Assessment Standards Branch

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METRICATION AND THE ASSESSMENT DIVISION - A REPORT ON CONVERSION CAPABILITY AND IMPLICATIONS

PREPARED BY:

MINISTRY OF REVENUE,

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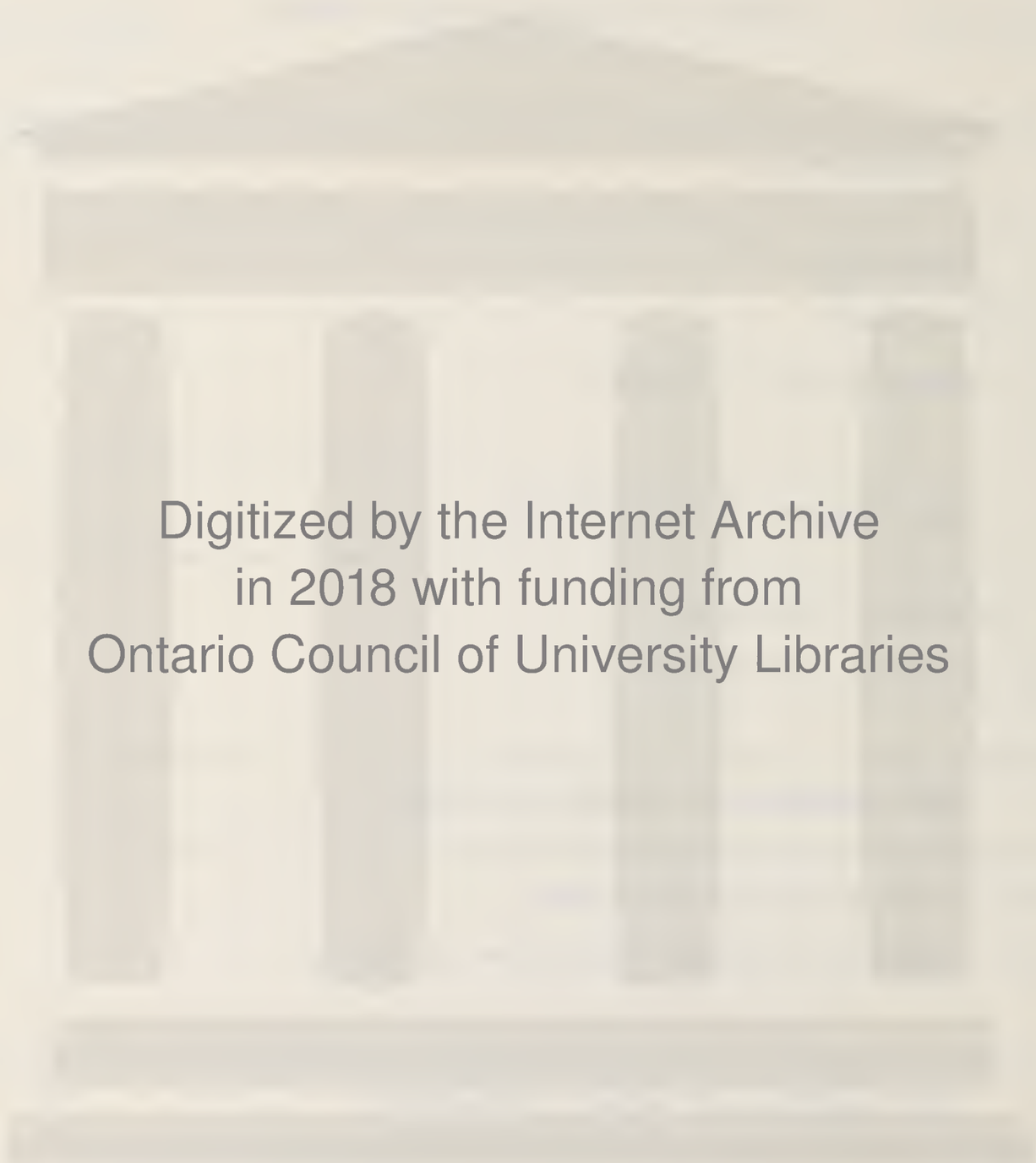
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Metrication and The Assessment Division
A Report on Conversion Capability
and Implications.

Summary of Recommendations

1. It is recommended that the Division adopt the prolonged Soft Conversion method to manually metricate Appraisal Cards.

   Within this, it is recommended that wholesale record conversion be substituted by Selective Updating. This means that only Appraisal Cards which are activated during the normal update process need undergo content conversion.

2. It is recommended that metric capability be accepted as one of the central features of the Valuation File. This capability includes the capacity to consume batched Imperial data at the input stage.

3. It is recommended that the Unilateral Metrication policy be adopted for assessment maps.

4. It is recommended that the Metered Hard Conversion approach be selected to convert assessment maps.

   Within this, existing Imperial dimension maps are reserved for en masse conversion subsequent to the completion of all Metric property maps.

5. It is recommended that appropriate Metric paper sizes and I.S.O. ratio scales be selected for the Division's entire mapping operation immediately. This policy has significant meaning in containing the magnitude of converting all assessment maps in the future.

6. It is recommended that the Metered Hard Conversion method be selected for the conversion of regional office management records. Within this, a high degree of flexibility should be incorporated to allow some implementation schedule variance.

7. It is recommended that the Soft Conversion method be selected to replace stationery at a rate geared to exhaust normal inventory.

8. It is the recommendation of the Metric Study Team that the Instant Hard Conversion method be selected to replace all non-Metric compatible measuring tools, e.g. rulers and tapes prior to commitment.

9. It is recommended that the Instant Hard Conversion method be applied to replace all non-Metric compatible equipment; to modify/adjust those which possess metric capability.

10. It is recommended that the Division advise its client/user group before any unilateral metric action. The time frame for advance notice should be three months.

11. The Metric Study Team recommends that any publicity programme directed to inform the taxpayer with regard to Metric property description should be integrated within the total Ministry public education programme.

12. It is recommended that intensive arithmetic conversion of the Valuation Manual be initiated immediately to anticipate development of the Integral Valuation Manual. This set of recommendation presupposes that the replacement cost method will be maintained in the near future.

13. It is recommended that the Metered Soft Conversion method be used to convert both the Condominium and Special/Exempt Manuals.

14. It is the recommendation of the Metric Study Team that the Standard Assessment System consider undergoing instant hard conversion immediately.

15. It is recommended that Divisional metrication activity be coordinated by a flexible pre-conversion planning scheme. Within this, Metric Gating decisions must be decentralized. A Metric Gate is the strategic point within a given organization where Imperial information inputs are converted for Metric consumption.

16. It is the recommendation of the Metric Study Team that a Divisional In-Service Training Programme be developed to supplement national/provincial and Civil Service Metric training programmes.

    The proposed in-service training programme will help impart second level Metric skills appropriate to the technical valuation function and its explication to the public at large.

METRICATION AND THE ASSESSMENT DIVISION
A Report on Conversion Capability and Implications.

I Introduction

1.1. Objectives

The subject of this study is to discover the implications of metric conversion for The Assessment Division. Within this, it is concerned with the internal and external dimensions of change as parameters for planning.

These principal concerns are forged into a set of questions which asks: how will the substitution of the Metric systems of measurement for Imperial units affect The Assessment Division internally? More specifically, to what extent will the assessment process be affected? In what ways will the changeover modify existing methods and processes? Will these changes create new budgetary requirements? Will these modifications create training needs? Answers to these and other questions broadly indicate the Division's conversion capability.

The possibility of metric conversion is also attended by a set of external concerns. These focus on questions which ask: how will metric conversion affect the Division's relations with its primary and secondary user-groups? Are these groups preparing to convert? When will their conversion take effect? How will the Division's changeover affect their consumption of assessment data? Will these user-groups expect the Division to modulate its change impacts, and if so, what are some feasible options?

1.2. The Study

The project was carried out by a two-member Metric Study Team which applied a combination of survey and field tracking methods, elaborated below.

1.2.1. The study design: The study plan was organized into two principal parts. Part 1 focuses on the internal conversion mechanics of the Division; Part 2, change implications which are external. Each part was in turn organized into subdivisions which sought specific answers. The two parts converged on the synthesis point where conversion dimensions were identified, examined and costed. These permitted the drafting of a tentative conversion schedule.

1.2.2. Sampling: Sampling options and sample sizes were determined within stringent time/cost constraints. The selection of Assessment Regional Offices for the study was based on the cogency of data within operating realities. Six Assessment Regional Offices were chosen according to 1. representative size, defined according to the jurisdictional boundary and the number of properties included; 2. representative operation, identified according to the scope and format of office organization; 3. uniqueness, differentiated according to the

predominant complexion of property types within the relevant office.

This set of selection criteria has meaning for the generation of a metric office profile which is capable of depicting various dimensions of conversion concern. As elaborated in its proper place below, different property types require appropriate valuation procedures and record maintenance methods. Thus, a farming community for example, will require a greater number of appraisal cards for land, out-buildings and related residences. These will also mean more measurement entries on the appraisal cards. However, the elaborate character of this record is accompanied by a simplified mapping operation since the density of properties per each geographical unit is low, and the property divisions are comparatively uniform.

1.2.3. Study Implementation: The study proposal received approval and its implementation benefited from close supervisory monitoring throughout its phases.

The thrust of data collection was focused on field tracking. This included the structured face-to-face survey, actual counting and record correlation. These survey instruments are offered as Appendix I.

User/client group surveys were accomplished by questionnaire, attached as Appendix 2.

1.2.4. Analysis: The analysis of data collected from the regional offices comprised of three parts: cost accounting depicting direct conversion expenditure;

tentative conversion capability, based on aggregate conversion manpower/time units; and tentative scheduling, based on elapsed time computations. Subsequently, a Metric Conversion Profile was generated to characterize an average of the three dimensions. User questionnaire responses were analysed to establish the external parameters. These were related to the Division's internal conversion mechanics, and optimal conversion timing.

1.3. Organization of Report

The report is organized into 13 parts which progressively sketch the global view of metrication and its assessment component. It begins with brief examinations of the concept of metrication, the S.I. system of units, the benefits of metric assessment, approaches to metrication, the mechanics of conversion, and the time/cost dimensions within these.

Specific conversion concerns of the Division are examined under sections 9 to 12. These sequentially focus on specific conversion items unique to the Division. Within these, each area covering record maintenance, conversion mechanics, conversion costs, training needs and user constraints are studied. Section 13 sums up the cost/time dimensions of conversion.

2. The Concept of Metrication

Metrication is a term coined to describe the process of introducing the metric system of weight and measures to replace Imperial units. Since units of measurement form a major part of our daily activity, the conversion task will have substantial ramifications. The scope of these is cast in sharp relief through the two analytical dimensions of conversion: content conversion and physical conversion.

2.1. Content Conversion

Content conversion refers to the conceptual dimension of measurement unit substitution within the metrication process.

Its scope has many facets. Symbolically, it bears on all references to measurements in speech and writing. Thus, unit references and standards will require conversion:

legislations setting standards, property descriptions in Assessment and Registry Offices, and to touch the man on the street, his criterion as to what constitutes a satisfactory 14 ounce steak will have to be in 396.89 grams.

More concretely, content conversion also has meaning for the conduct of our lives, and by extension, administration. For example, the volume of a normal 10 oz. (284 c.c.) can of Coke can no longer be tolerated under content conversion since its metric equivalent is not a "round" number. This will require two-types of adjustment: The first is metric volume measurement; the second, contents which will conform to the expectations of the metric system. Accordingly, production scheduling, distribution, costing, pricing, packaging and merchandising will be affected. In turn, these metric adjustments will affect the public since the amount of consumption will likely be 300 grams (10.56 ozs.) rather than 284 c.c. It must also learn to tolerate the attendant increases in prices and taxes.

Several forms of content conversion independent of parallel physical conversion is evident in Ontario. The hospitals use metric measurements, but the paper generally in use is Imperial. Same with the photographic industry where the optics, chemicals and films are metric; the prints, Imperial. This aspect of conversion as it relates to the Division will be elaborated under conversion mechanics (6) below.

2.2. Physical Conversion

Physical conversion refers to the format changes which are brought within the metric system of weights and measures.

This has meaning for product repackaging and redevelopment. First, products which are changed in weight/volume/dimension under content conversion as they are redesigned to "round" metric specifications will require repackaging. This creates the need for physical conversion.

Second, product redevelopment may be independent of content requirement but is induced by the physical need of metric conversion. Paper provides a significant case in point.

Paper products in a metric environment will be reduced in the number of available sizes and shapes. This physical difference will have distinct ramifications in the office environment. Accordingly, metrication will visibly create the need to change physical paper sizes, their files, storage and reproduction. Concomitantly, any material contents having Imperial weight and measure reference must be converted simultaneously.

3. The Preferred S.I. System of Units

3.1. Features of the S.I. System

A system of units may be characterized as one in which the units bear a direct numerical relationship to each other. In the metric system all units are related to each other in multiples of ten; thus the centimetre, metre and kilometre are related by the numbers 100, 1000 and 100,000.

In contrast, the inch, foot and yard of the Imperial System of units are correlated by the numbers 12, 3 and 36. Because this set of numbers is not linear, it is more difficult to convert yards into inches than to convert meters into centimetres. The decimal approach is therefore one of the prin-

cipal advantages of the metric systems of units.

The metric system is a newcomer in comparison to the Imperial system. Devised some 150 years ago, the metric system has yielded five sub-systems to meet rapidly-evolving technological needs. The system Canada hopes to adopt is the "S.I." or the International System of units.

The S.I. system came into being following the resolution of the Eleventh General Conference of Weights and Measures in 1960. This system is chosen for international use because it has several unique features. First, it is a decimal system. Second, it uses many units which are part and parcel of industry and commerce, e.g. volt, ampere, kilogram, watt, etc. Third, some of the most basic relationships in electricity, in mechanics and in electromechanics enhance rapid conversion. Fourth, its ability to be used simultaneously for scientific and everyday application promises to relate and blend experiences in the theoretical and practical worlds. In this way, some of the communications barriers previously erected between the two communities can someday be removed.

Finally, the S.I. uses six basic units from which all others can be derived. Three of these, namely the ampere, the candela and the second are in full use in Canada now. The basic units of the S.I. are:

Length - the metre
Mass - the kilogram
Time - the second
Electrical current - the ampere
Thermodynamic temperature - the Kelvin
Luminous intensity - the candela.

3.2. Standards Setting within the S.I. System

A strategic factor in the Canadian metric commitment is standards setting within the S.I.system. To reap the full benefits of metric conversion, Canada must develop rational metric specification standards to encourage product rationalization and product compatibility with those on world markets. This responsibility falls on The Standards Council of Canada.

What are some of these standards? Certain standards within the S.I. system have already been developed by the International Organization for Standards. Referred to as ISO standards, these cover areas like metric nomenclature, paper sizes and rational ratios for use in mapping. There are standards which should be specific to Canada and North America. For instance: What should be the width of a "metric" road? These and similar standards of uniformity will extend the existing common bases throughout the continent.

4. The Benefits of Metric Assessment

4.1. Content Uniformity

The linearity of the metric system of numbers is conducive to rapid measurements and calculations which in turn contribute to a higher degree of accuracy.

The assessor for increased ease and speed has been measuring and calculating fractions of a foot in tenths. This use of the decimal system within the Imperial system demonstrates and emphasizes the potential benefits of an all-decimal metric system.

4.2. Physical Uniformity

Content efficiency is accompanied by efficiency achieved through uniform record formats. This will reduce the

shape and size variations which impede smooth paper flows. The reduced selection of metric paper sizes will reduce the time spent in the traditional combination of a particular format to match a particular function. This will also sharply reduce the duplication of stationery inventory. The number of codes required to order different paper sizes will be reduced, so will the files, storage equipment. More favourable office economics may be expected as a by-product of streamlining.

5. The Approaches to Metrication

The conversion approaches which are identified below are not mutually exclusive. They are analytical constructs emphasizing the most dominant condition which clearly characterizes it over the other. Accordingly, both subsume some of the conditions, stresses and costing problems of the other.

5.1. The Soft Conversion

This method is characterized by the extended period in which metrication is scheduled to be completed. It is further associated with an initial phase of conversion in which the Imperial system is permitted to co-exist with the Metric.

This method is probably least disruptive since it provides linkages between the old and the new and at the same time allows existing inventory to be exhausted. Its implementation is primarily shown by the simple changing of product literature and labelling for the phasing-in stage, rather than redesigning the product or its process.

There are two principal variants of Soft Conversion:

5.1.1. The Prolonged Dual Conversion: This approach within the soft conversion method is characterized by a schedule which is governed by cycles of inventory turnovers and updating processes. More specifically, this approach maintains existing procedures as its main stream; metric, as a supplementary. For this reason, both costs and conversion efforts are held at a minimum. Its serious disadvantage is the further proliferation of methods, processes and record formats. It also tends to weaken the desire to change.

5.1.2. The Metered Dual Conversion: This approach introduces a time constraint to the prolonged dual system. It is more active. Target dates for completion of planned stages in the conversion process are set in advance to override operating processes incompatible with them.

The advantages of this method are clear-cut commitments, abatement of initial conversion costs and minimum wastage. Its disadvantages tend to duplicate, to a degree, those of its prolonged conversion counterpart.

For the purpose of the Division, part of its operations (for instance mapping and appraisal cards) should fruitfully exploit this method.

5.2. Hard Conversion

Hard conversion requires a total commitment to change. It is actively focused on physical and content conversions. This approach offers two variants which are differentiated by the temporal element.

5.2.1. The Metered Hard Conversion: This approach attempts to juxtapose predominant metric equipment and inventory purchasing schedules with cycles of normal equipment attrition and inventory turnover. Time constraints and the nature of operation determine how successfully this can be accomplished. For example, if total conversion of an operation was scheduled over a one year period, it is likely that equipment conversion/replacement will have to be effected before their normal depreciation/ obsolescence schedules. For this basic reason alone, metrication costs will closely mirror the costs associated with the extent to which these situations prevail. This metered approach shares some of the merits of the metered dual conversion method. However, its predominant metric-orientation and stringent time table spell a greater sense of urgency.

5.2.2. The Instant Hard Conversion: This approach is unique since it effectively adheres to a zero time dimension. While preparatory stratagems pave way for its introduction, its implementation is instantaneous. This instant hard conversion is characterized by its possible disruption and cost since it requires that existing inventories, equipment (and procedures surrounding them) be totally supplanted on "metric day".

This approach expresses greatest merit in its dynamic commitment and a clear break with the past. The objections raised with respect to cost and disruption are more abstract than real since its implementation must tolerate some systemic sunk costs.

5.4. Conversion Experiences in Other Jurisdictions.

The paucity of information which seeps from Ottawa suggests that the federal metric plans are British in concept. This is augmented by degrees of technological over-dose.

Britain decided to go metric in 1965, allowing ten years to complete conversion. At the half-way point there was, allegedly, little evidence that the general public was aware of this national commitment. Metric impact on the street level consisted largely of label dualism, with Imperial content priority. Paint, for example, is marketed in quantities marked in both gallons and litres. There has also been little specific government action to set standard and control format, particularly on the retail level. Hence, consumers continue to relate their daily activities in inches, pounds and gallons.

While this dual system has survived, most major industries have either changed over completely or are approaching that terminal state. It is expected that the consumer will begin to feel the full impact this year as many important changes are planned. Metrication will, according to the Metrication Board, progress rapidly towards a completion date between 1977 and 1980.

South Africa is well on the road to a complete change. Australia has applied the metered soft conversion; New Zealand, on the verge of national commitment. In a statement made to the Metric Workshop of the Institute of Public Administration of Canada on September 6, 1973, Mr. S.M. Gossage, Chairman of The Metric Commission indicated that Canada would probably move unilaterally on the metric road before the U.S. The pronouncement of national commitment is reportedly contingent on the Standards Council of Canada.

6. The Mechanics of Conversion

Physical and content dimensions of metrication have significant and compelling meaning for conversion mechanics. The implications of physical conversion are manifested; those of content, often concealed. Both are heavily interdependent.

For the purpose of assessment, physical conversion equates the consumption of redeveloped metric products. For that reason the conversion process represents one of replacement.

Content conversion, on the other hand, must be conceived as product redevelopment. For the purpose of the Division, two independent methods or their appropriate combination, can be used to effect the wholesale changeover.

6.1. Manual Content Conversion

This method is based on arithmetic conversion. This is accomplished operationally by applying a conversion factor to the Imperial value to yield the equivalent metric product. For example, using a factor of 2.54 centimeters for inch conversion, one can easily compute that 12 inches equals 12 X 2.54 = 30.48 c.m. This method implies a single incident calculator operation, assisted by conversion tables and conversion factor.

The Metric Study Team finds the manual method labour intensive since it requires three related steps to convert assessment records:

1) erasing of existing Imperial measurement entries;
2) the manual process of arriving at Metric equivalents; and
3) the re-entry of derived Metric products in place of Imperial measurements.

The use of a dual system may require some recopying of existing data in addition to steps 2) and 3) above. The need to recopy certain records, such as appraisal cards, is due to the limited space designated for entries.

Due to the danger that typographic errors or inaccuracies may be introduced in the recopying stage, it is strongly urged that the dual system be discouraged as an option.

6.2. E.D.P. Content Conversion

E.D.P. conversion is a mechanized batching of arithmetic conversion. It is theoretically an attractive option.

In operation, the application of E.D.P. conversion is dependent on the nature of data and its form of arrangement. Accordingly, we must ask the questions:

1) Are the records machine compatible?
2) Are the data fields adequately defined?
3) If these criterion for E.D.P. metric content conversion are not met, will time/cost savings warrant altering the data format to allow E.D.P. conversion? Considerations such as these as they pertain to a given set of records will establish the feasibility and desirability of E.D.P. conversion.

The Study Team feels that E.D.P. conversion techniques are most compatible with computerized appraisal cards since conversions can be batched, with little added time/cost involved.

The Team is currently uncertain whether the computerization of appraisal cards remains one of the Division's intermediate goals. This uncertainty is derived from the priority status accorded the Valuation File project. Depending on the data elements incorporated into the File, it is highly conceivable that the Appraisal Cards will be supplanted.

6.3. Content Conversion Through Remeasurement

This approach is labour/cost and time-intensive since conversion is accomplished by remeasuring all properties in the Province in Metric units. Although this conversion method affords the highest degree of accuracy, this may not adequately offset cost/time tradeoffs.

7. The Timing of Metrication

The timing of metrication has relevance for change relationship, change management and time/costs. It affects structure, processes and people. It also creates a changing environment which induces responses and further interactions.

7.1. The Synchronized Conversion

Synchronized conversion creates an environment which co-ordinates the change activities of its component parts. It is the most rational and efficient approach since the direction, time and rates of change are established on a basis common to all. This eliminates delays and wastes in the forward and backward linkage mechanisms which govern supply/production/distribution/consumption.

For the purposes of assessment, the establishment of common units of exchange within specific time frames permit optimal scheduling. This also permits work organization to respond appropriately to the momentum of change. More specifically, since data inputs (such as Registered Plans and Deeds) are in readily consumable metric units, no content conversion would be necessary. Similarly, physical conversion efforts are reduced due to ready availability of metric supplies. This conversion ease is duplicated in the Division's output.

7.2. Unilateral Conversion

This conversion timing may be created by internally generated demands for conversion to short-circuit the delay of synchronized conversion. Such demands often arise when time/cost investments and long term projects cannot tolerate the waiting period required to schedule synchronized conversion.

For the purpose of assessment, there is compelling reason to argue in favour of this approach. Assessment maps, to begin with, will benefit from early unilateral change since their physical and content conversion are both labour and time intensive. This issue will be elaborated under 9 below.

8. The Costs of Metrication

Metric cost computations are conditional upon the costing method used, the conversion approach adopted and the time/rates of change. Ideally, separate costing total should be generated for each set of variables.

The Metric Study Team has considered several costing options, but retained the ones which conform to rational criteria only. Their computation is offered to aid overall planning.

The approach to costing metric change in other countries has focused mainly on benefits. The only firm statement about cost is that it will rise in relation to the postponement of change. Most estimates place the annual cost rise at 8% for both the public and private sectors.

8.1. Cost Determinants

8.1.1. Time: A trade-off exists between time and cost dimensions of metrication. Rigid time requirements will likely create disproportional cost increases since scheduled target completion dates may require replacement of partially depreciated equipment and unexhausted supplies.

8.1.2. Capital Investment: Costs of metric conversion vary positively with values of capital investment within given time constraints. Thus, high capital equipment investment must absorb the cost in converting the equipment to metric standards.

Fortunately, capital equipment investment is relatively low in the assessment operation. The convertible ones can be brought within Metric specifications with nominal cost; the non-convertible ones are either rental, in which case the costs are externalized; or single-incident items such as rulers, measuring tapes and paper products. These are separately considered below.

9. Conversion Concerns of the Assessment Division

Physical and content conversions are the principal concerns of the Assessment Division. These are in turn separated under Head Office and Field Operation categories since each confront conversion problems specific to each. Within these, realistic conversion options for the Division are examined under 9.3, 9.4, and 9.5 below.

9.1. Content Concerns

9.1.1. Appraisal cards: The appraisal card functions both as the basic medium of assessment data storage and valuation work sheet. With each appraisal card, approximately 45 item entries are expressed in Imperial measurement units. Several support qualitative data express building material or codes which are associated with Imperial standards. These references are excluded in conversion computations since they will change in step with Metric Standards. The use of Valuation Manual rates will also be changed as part of the overall assessment process and thus is excluded as well. The study sample suggests that the "average" or "typical" regional office will most likely have an inventory of 98,420 appraisal cards. Each card, in turn, will hold an average item count of 45.6. The need to convert each of these entries demonstrates the potential scope of change.

The conversion mechanics considered most appropriate are manual arithmetic, assuming that appraisal cards will not be computerized. The Study Team also considers the timing and rate of conversion under record maintenance below.

9.1.2. Maps. The mapping data used in this report were generated by the Assessment Services Section of The Standards Branch through its recent mapping survey of the Division. This mapping inventory provided a basis to relate existing scales and sheet sizes to ISO metric standards.

Approximately 95% of the existing maps in the Study Team's sample falls within the tolerance limits listed by the Interministerial Committee on Standards and Specifications through its Metric Conversion: Map and Plan Scales, Ratio and Paper Sizes.

The Study Team, however, found few of the scales in use conformed to those specified according to I.S.O. Accordingly, while the existing assessment maps can be "tolerated" through loosely set acceptability limits, they must all undergo content and physical conversions.

Since assessment maps continue to be prepared in Imperial units, there is compelling reason to launch unilateral metrication to forestall further proliferation of map ratios and sizes. This early metric commitment will also contribute to reduce future conversion costs.

The first incidental concern associated with mapping is the eventual need to convert property descriptions into Metric units. This may be accomplished by "Metric Gates" which are the strategically placed conversion points within a given office operation to process Imperial information inputs. Considerations for these "Metric Gates" and their placement will be offered under organization for Metric below.

The second incidental concern associated with mapping is focused on Registered Plans some of which do not conform to Metric tolerances. The use of these plans requires the same form of pre-consumption treatment in the form of "Metric Gates".

9.1.3. Office Forms/Stationery: The assessment operation and each of its component functions are expressed through a set of office forms and stationeries.

It is observed that the frequency and volume of office form use are inversely related to the level of operation. More specifically, the higher the operating level, the fewer the number of forms used. The reverse characterizes the quantity and variety of forms used on the operating level.

The frequency of forms used also varies with respect to hierarchical level. Specifically, the forms relevant to the managerial level are predominantly single-incident ones used for reporting and controllership. These also contain a minimum of measurement units which require conversion. Thus, the extent of relevant change is focused on physical dimension.

Forms used on the operating level are multi-incident. These tend to function as record and processing bases. The number and variety of forms may also contain measurement units which require conversion. The Metric Study Team studied each type of office form used, its incident frequency and the extent of content conversion required. The Team concluded that this category of office forms all require wholesale physical conversion, a minimum of content conversion.

The only exceptions are found in Teela sales data information sheets and building permits. Both will require large scale manual/arithmetic pre-consumption conversion if metrication is not synchronized. Synchronized metrication requires no action by the Division.

E.D.P. compatible input reporting forms such as the Assessment Data Sheet and computer print-out such as the assessment roll and the Assessor's Return will require no physical conversion, minimum content conversion. For the first two, a single conversion subroutine will batch all Imperial entries during a normal pass of the file.

9.1.4. Valuation Manuals: The Assessors' Valuation Manual requires both physical and content conversion. Content conversion, in turn, requires two sets of separate responses.

First, the Valuation Manual may be converted arithmetically to Metric values. This approach will adequately accommodate costing requirements for structures erected according to Imperial building standards. The time frame for this arithmetic conversion is estimated to be about three months, and the conversion will also dispatch the physical conversion.

Second, the Valuation Manual must be developed according to "integral" requirements subsequent to a Metric Canada. Such an "integral" approach will reflect construction costs associated with Metric standards and methods. This Manual will be applied to value post-Metric structures. The time frame for developing this manual is approximately one year.

Since pre- and post-Metric properties must be valued on a mass appraisal basis, it seems likely that both Manuals will co-exist in the Division as valuation guides. This duplication of cost is a relatively unique feature in metric change.

9.1.5. Measurement tools: Measurement tools, rulers for example, do not constitute a content conversion concern since they are dependent on physical standards. Thus, these cost items are reserved for discussion below.

9.1.6. Office machines/equipment: Content conversion to office machines and equipment are limited to capacity only. For example, duplicating machines which are Imperial can be adjusted/modified to yield Metric reproductions. The same applies to folding machines.

Weigh scales and postage machines can be converted to show Metric readings and relate weights to Metric postage rates. A survey of inventory indicates that there are about 70 weigh scales in use throughout the Division. The more sophisticated ones can be reconverted by the manufacturer at an approximate cost of $15. - $25. each. Postage meters are rental items whose conversion costs are externalized.

While the spacing of existing typewriters are Imperial - say 10 or 12 spaces/inch - these need not be converted since the assessment operation does not require ultra precision spacing. Even when computer input forms (A.D.S.) are prepared, the space tolerances will likely accommodate Imperial unit spacing.

9.2. Physical Concerns

9.2.1. Appraisal Cards: With the exception of special/ exempt and condominium cards, all appraisal cards are designed on the stock tape format. It is speculated that the Metric system will not hasten its obsolescence. For this reason, physical conversion of appraisal cards need not become an immediate concern of the Division.

9.2.2. Maps: Existing map sheet sizes do not conform to ISO sizes.

A mere 3% of the maps in the regional offices polled have dimensions that fall within a 10% tolerance range of the A-series paper sizes. The A-series is a set of paper sizes recommended by the International Organization for Standards for general purpose use.

The same survey demonstrated that approximately 50% of existing maps fall within a 10% tolerance range around the B-series paper sizes. This series of paper sizes is recommended by ISO for special purpose uses. The B-series sizes have been discouraged for general use in the province by The Interministerial Committee.

Due to the magnitude of variance from the A-series paper sizes, the physical conversion of assessment maps is a major conversion concern for the Division.

Since non-Metric compatible assessment maps are being continually prepared, and each of these must be converted for an eventual Metric Canada, it is crucial that this operation be committed to METRIC NOW.

A highly anomalous situation now exists in the Sudbury area. The Sudbury Planning Board has decided to metricate unilaterally with the result that its outputs are metric. Because of the format of input to it, the assessment mapping section has been forced to convert all incoming Metric data to Imperial measurements for mapping purposes.

9.2.3. Occasional Office Forms: Physical conversion of occasional office forms(such as Bi-weekly Work Report Sheets) is accomplished through the blanket ordering of metric size stationery. It is anticipated that this change will require redeveloping some of these forms.

The survey determines that redevelopment time/cost associated with these occasional forms are minimal.

Drafting new replacement forms which have area-wide application could be handled by existing Divisional or Ministry resources (Forms Control section within Administrative Services). Forms with Division-wide application, such as Cash-Flow Analysis Forms, can be developed centrally and for that reason reduce the per unit art work, set up costs and printing cost. Physical conversion of letterhead stationery is excluded from costing consideration since they are now generally available throughout field offices.

Other stationery supplies need only be supplanted by metric stationery during their normal inventory replenishment cycles. For this reason, these replacement costs are not normally attributed to metrication. However, in the event that dumping becomes a condition of hard conversion, all attendant extra-routine costs are computed.

9.2.4. Cost Manuals: The physical conversion of Manuals logically attend the process of their content conversion. The incidental printing costs are absorbed as part of their routine updating.

9.2.5. Measurement/Drafting tools: Drafting scales, rulers, measuring tapes are single-incident replacement items. Their physical change is a condition of content conversion. The costs associated with this wholesale change is set out under 9.4 below.

9.2.6. Office machines/equipment: The majority of office equipment used by Assessment Division is broadly associated with paper storage, processing and manipulation.

These machines have been characterized by their capacity to process a great variety of paper sizes developed within the Imperial System. For this reason, the built-in flexibility of these equipment can either accommodate Metric paper or this can be adjusted/modified for same.

Storage cabinets will hold the metric A4 paper size destined to supplant existing legal and letter paper sizes.

Copiers, duplicators and mailing machines can be modified at little or no cost to the Division.

Typewriters require no modification since their Imperial spacing will not interfere with normal assessment work. The Imperial carriages - 11 to 18 inches - will hold A-4 size Metric paper.

Calculators will require modification unless the print-out tape take-up spacing cannot accept Metric size rolls. These non-Metric compatible machines can be either modified or allowed to remain functional through the use of Imperial size print-out rolls.

Microfilm readers are Metric (16mm) but their photostatic copies are Imperial. Their physical conversion will be accomplished by stocking Metric size photo-sensitive paper from Kodak.

There is no strong indication that Computer companies will likely change the size of their stock tapes. Thus, the binding and storage of computer I/O will only be affected when supply sources undergo change.

9.3. Record Maintenance

The actual mechanics of metrication are dependent on the conversion approach, timing and their interfacing.

For the purpose of this study, only operationally feasible options are recommended.

9.3.1. Appraisal cards: The Metric Study Team considers the manual conversion of Imperial unit entries most reasonable. This approach is based on the assumptions that the Assessment Valuation File will displace the need for the computerization of Appraisal Cards. In the event that appraisal cards are computerized, Metric conversion can be batch changed.

It is reasonable to assume that most existing Imperial records will co-exist with the Valuation File regardless of the degree to which the replacement cost method is de-emphasized as a result. The manual conversion of Appraisal Cards should be performed only when relevant property files are activated for updating purposes. These updates converge on ownership/tenant changes, structural modification, demolition, reassessment etc.

The dual system of measurement entry as discussed in 6.1. offers little merit since the process mechanics are laborious. The duality of entry may also create future confusion and increase error possibility.

Recommendation 1:

It is recommended that the Division adopt the prolonged Soft Conversion method to manually metricate Appraisal Cards.

Within this, it is recommended that wholesale record conversion be substituted by Selective Updating. This means that only Appraisal Cards which are activated during the normal update process undergo content conversion.

Recommendation 2:

It is recommended that metric capability be accepted as one of the central features of the Valuation File. This capability includes the capacity to consume batched Imperial data at the input stage.

9.3.2. Maps: The Metric Committee Report made an interesting suggestion that existing Imperial dimension maps may be converted to acceptable I.S.O. metric sizes by photographic enlargement or reduction. This approach is not the panacea it purports to be, since photographic enlargement or reduction both converge on physical map dimensions only. For this reason, it is pseudo-Metric.

Further, photographic enlargement or reduction will convert neither the Imperial property descriptions nor the scales used in the maps. Accordingly, the most crucial aspect of metrication is therefore beyond the scope of this approach.

While the application of Metric scales to Imperial maps allows the user to determine Metric measurements from the optically converted maps, this misses the spirit of the changeover since its form takes priority over content.

To further compound the problem, a great number of existing maps in the Division - special purpose and otherwise - are significantly skewed for specific functional requirements. A high percentage of these maps, too, do not come close to the length: width ratio (2: 1) properties of all metric paper sizes. Thus projected enlargements or reductions of existing maps cannot be brought within the ratio relationship of metric paper length/width dimensions. This justifies the rejection of the Metric Committee solution. For this reason, it is strongly urged that both the content and physical conversions of these maps should only be attempted subsequent to the completion of all Metric assessment maps.

As with appraisal cards, duality of measurement entries should be strongly discouraged in mapping to avoid confusion, and related legibility problems. Any short-term need to derive Imperial property descriptions from these new Metric maps could be met through ratio measuring scales which express Imperial units. Likewise, the Division's present program to complete a comprehensive mapping of the province should take priority over the conversion of existing maps.

Special purpose maps, strip maps for example, need not necessarily conform to metric paper sizes. Since they are designed primarily according to property characteristics. For this reason, single or multiple purpose strip maps should not be required to sacrifice utility for form.

Recommendation 3:

It is recommended that the Unilateral Metrication policy be adopted for assessment maps.

Recommendation 4:

It is recommended that the Metered Hard Conversion approach be selected to convert assessment maps.

Within this, existing Imperial dimension maps are reserved for en masse conversion subsequent to the completion of all Metric property maps.

Recommendation 5:

It is recommended that appropriate Metric paper sizes and I.S.O. ratio

scales be selected for the Division's entire mapping operation immediately. This policy has significant meaning in containing the magnitude of converting all assessment maps in the future.

9.3.3. Other records specific to Regional Office Management: Regional Office Management records such as Mileage Claims Forms, attendance and personnel records are physically converted to Metric when their normal inventory becomes exhausted.

Since a majority of these forms are modified/amended on a continuing basis, their conversion costs will be nominal.

As will be elaborated in 10.3 below, each Regional Office will assume a crucial role in the choice of metrication mechanics and in conversion scheduling. Ultimately, successful programme implementation will be hinged on how the respective conversion needs of each office is communicated to the central unit for integration.

Recommendation 6:

It is recommended that the Metered Hard Conversion method be selected for the conversion of regional office management records. Within this, a high degree of flexibility should be incorporated to allow some implementation schedule variance.

9.4. Supplies

9.4.1. Stationery supplies should be exhausted before their Metric replacement. This will minimize waste, and reduce cost.

9.4.2. Measuring tools which are non-Metric compatible are replaced as a pre-condition to conversion implementation.

The early introduction of Metric rulers and tapes contributes to familiarize users, helping them to become rapidly operational in the new Metric world.

9.5. Equipment

Equipment - such as weighing scales - which possess Metric capability and are owned by the Division can be modified/ adjusted to conform to appropriate specifications.

Rental Equipment - such as postage meters - will be modified to operate according to Metric standards.

Recommendation 7:

It is recommended that the Soft Conversion method be selected to replace stationery at a rate geared to exhaust normal inventory.

Recommendation 8:

It is the recommendation of the Metric Study Team that the Instant Hard Conversion method be selected to replace all non-Metric compatible measuring tools, e.g. rulers and tapes prior to commitment.

Recommendation 9:

It is recommended that the Instant Hard Conversion method be applied to replace all non-Metric compatible equipment; to modify/adjust those which possess metric capability.

10. Conversion Capability

10.1. Timing

Conversion timing has meaning for the type of responses generated to meet the change demand. Cost relationships are also affected within this interface.

10.1.1. External considerations: Synchronized conversion will automatically eliminate this external task. Unilateral conversion requires that client/user groups of the Division be informed in advance.

A sample of the Division's client/user group was polled by the Metric Study Team. The responses to the User Questionnaire (Appendix 2) converge on three areas:

(1) Little active planning is focused on metrication;
(2) Collectively, the client/user groups do not anticipate significant impacts from Metric assessment output;
(3) The groups expect advance notice of unilateral metrication ranging between 2 months to 2 years.

Recommendation 10:

It is recommended that the Division advise its client/user group before any unilateral metric action. The time frame for advance notice should be three months.

In the case of synchronized conversion, no advance notice is necessary.

10.1.2. Publicity Programme Directed to Tax Payers: The Metric Study Team considered the need for this action but concluded that this should be integrated within a total Ministry publicity effort.

Recommendation 11:

The Metric Study Team recommends that any publicity programme directed to inform the tax payer with regard to Metric property description should be integrated within the total Ministry public education programme.

10.1.3. In-Service Training: In-service training focused on imparting operational Metric capability should be programmed three-months prior to wholesale change-over. This will be elaborated in 11 below.

10.1.4. Form Redevelopment: Form redevelopment for Metric conformance may be accomplished either under normal/ routine amendment or effected under content conversion.

With existing Ministry resources a given form may be developed within 2 - 3 weeks. A lead-time of 6 - 8 weeks is considered adequate for printing and distribution.

10.1.5. Valuation Manuals: The converted Metric Valuation Manual and its Integral counterpart require conversion time frames. These are set out below:

Redevelopment/ Conversion Stages	Valuation Manual Types Conversion Time in Months	
	Converted	Integral
Conversion	4	8.0
Drafting	12	12.0
Printing	1.5	1.5
Collating	1.5	1.5
Total	19months	23 months

Recommendation 12:

It is recommended that intensive arithmetic conversion of the Valuation Manual be initiated immediately to anticipate development of the Integral Valuation Manual. This set of recommendation presupposes that the replacement cost method will be maintained in the near future.

10.1.6. Condominium/Special Exempt Manuals: The Condominium Valuation Manual requires little content conversion since property descriptions can be batch changed within its data file. Physical conversion can be effected during its routine updating.

Special-Exempt manuals require the treatment as Valuation Manuals (10.1.5.)

Recommendation 13:

It is recommended that the Metered Soft Conversion method be used to convert both the Condominium and Special/Exempt Manuals.

10.2. Pre-conversion Coordination

Several pre-conversion coordinations within the Division warrant close scrutiny. These converge on planning activities focused on programme/procedure development.

The principal pre-conversion coordination requirement bears on the Standard Assessment System which is developing uniform organizational methods and procedures for implementation throughout the Division. Accordingly, the thrust of all S.A.S. sub-systems must be cognizant of their impacts on the Metric assessment and vice-versa.

Recommendation 14:

It is the recommendation of the Metric Study Team that the Standard Assessment System consider undergoing instant hard conversion immediately.

10.3. Pre-Conversion Planning and Metric Gate Decision

Pre-conversion planning to coordinate Division-wide metrication activity is crucial to successful implementation.

The Study Team makes no specific recommendation at this juncture since the S.A.S. will most likely be in effect before "Metric Day", and will shape both the scope and format of these consultations.

The Study Team feels, however, that organizational flexibility must characterize Regional Office Metrication efforts. The authority to establish Metric Gates, for example, must be delegated to the operating level, according to prevailing conditions which surround it. A "Metric Gate" refers to the strategic conversion point within a given organization where Imperial information inputs are converted for Metric consumption. The placement of these "gates" must be established according to the flow of input data and work division since any imbalance of the line creates a bottle neck.

Recommendation 15:

It is recommended that Divisional metrication activity be coordinated by a flexible pre-conversion planning scheme.

Within this, Metric Gating decisions must be decentralized. A Metric Gate is the strategic point within a given organization where Imperial information inputs are converted for Metric consumption.

10.4. Converting Legislation

Existing legislation and Ontario Regulations within it contain Imperial unit references which must be changed to Metric equivalents.

The necessary Metric amendments to The Assessment Act and its Regulations have been submitted to the Interministerial Sub-Committee on Legislation on April 9, 1973 to receive eventual wholesale change (Appendix 5). For that reason, these need not be separately considered in detail here.

10.5. Pre-conversion Intra-Divisional Metric Training

In-service Metric training enhances and assures conversion capability. This intra-Divisional programme should be offered in conjunction with those planned for the Civil Service.

The Division requires its own in-service training above and beyond those offered by the Province to meet rather unique functional requirements. The proposed in-service training is elaborated in 11 below.

11. Intra-Divisional Metric Training

11.1. Federal-Provincial Socialization Programme

This societal/national publicity programme is planned to usher in the Metric era. It is primarily focused on the consumer and thus must be supplemented by the Division's own technical in-service training.

11.2. Ontario Civil Service Training Programmes

These converge on imparting basic Metric knowledge on the operating level and will not likely recognize all the specialist needs of the Division.

These reasons justify the need to develop a separate in-service training programme to satisfy unique Metric requirements of assessment.

11.3. Objectives of the Divisional In-Service Programme

The proposed in-service training programme is characterized by two sets of complementary objectives:

(1) To reinforce the commitment for conversion and to extend the horizon of Metric appreciation;

(2) To impart second level skills in Metric operations. This skill level is focused on an ability to conceptually bridge the two systems of measurement and to function effectively within the Metric system.

Both objectives of the training programme are crucial to the technical assessment function and the translation of valuation results to the public at large.

11.4. In-Service Training Format

In addition to its objectives, the Metric Study Team also solicited comments which bear on the format of in-service training.

The favoured training format is the Participatory Seminar/ workshop. The preferred duration of training varies between one to three days. Programme delivery will be assigned to two two-men teams which simultaneously visit different Regional Offices.

While the in-service training programme awaits development, it is envisaged that its dominant thrust will yield an experience of total Metric immersion. Within this, emphasis will be focused on the conceptual and empirical dimensions of learning. These are expressed through programmed learning aids and advanced audio-visual techniques which cumulatively enhance assimilation.

Subsequent to the audio/visual/tactile introduction will be a seminar in which both the macro and micro aspects of metrication will be discussed. The macro aspect relates to overall societal changes brought about by the conversion; the micro, the individual and associated components.

The technical components of the workshop will consist of Metric and conversion applications. The concepts, application methods and conversion formulae are incorporated into a Metric Guide which is designed for general reference.

11.5. In-Service Training Costing

The costing of this in-service training programme is concerned with direct implementation only. It excludes development and attendance costs respectively.

The direct costs of in-service training is estimated below:
a) Equipment/Supplies

Items	Cost	Development Time
A-V equipment *	$4,500	n/a
Participatory learing aids	$ 350	n/a
Training guide/manual	$2,000	3 mos.
Visual display	$ 700	3 mos.
Exercise sheets	$ 100	n/a
Conversion tables	$ 100	2 mos.
Total	$7,750	8 man/months

*Audio-visual equipment costs are computed on the assumption that A-V equipment will be available for sharing within the Assessment Division.

b) Delivery

Travel/subsistence	Cost	Time
4 instructors @ $35/day	$5,600.	140 man/days

c) Implementation Total

Equipment ($7,750) + Delivery ($5,600) = $13,350.

11.6. Need for Refresher Courses

Senior assessment personnel surveyed by the Metric Study Team overwhelmingly requested refresher Metric courses or workshops.

The Study Team recognizes the value of refresher workshops but recommends that their formatting and delivery be developed subsequent to an appraisal of the effectiveness of the in-service training programme.

Recommendation 16:

It is the recommendation of the Metric Study Team that a Divisional In-Service Training programme be developed to supplement national/provincial and Civil Service Metric training programmes.

The proposed in-service training programme will help impart second level Metric skills appropriate to the technical valuation function and its explication to the public at large.

12. Conversion Costs

Conversion cost estimates are computed according to location of anticipated expenditure. One set of estimates is offered for costs which will be incurred centrally. These include, for example, Manuals and forms which are developed and produced by Head Office for field use. A second set of estimates is offered to compute costs which are expected to occur in Regional offices. These include single-incident costs in the replacement of supplies, for example. All field cost computations are based on an average of the most probable costs which will be incurred in the six offices surveyed. These costs are extrapolated for the Division to cover a three-year conversion period.

All cost estimates are relevant to the metrication approach recommended by the Study Team. No attempt has been made to compute costs incurred by other combinations of conversion time/method variables due to the severe time constraints which confronted this study. Marginal variations in normal operating costs caused by metrication are ignored, so are costs which can be absorbed as part of the routine updating process.

12.1. Head Office Cost Estimates

12.1.1. Valuation Manuals Development/Printing

Converted Valuation Manual	$21,000
Integral Valuation Manual	$30,000
Condominium Valuation Manual	$ 4,000
Special/Exempt Manual	$ 6,000
Sub-Total	$61,000

12.1.2. Form Development/Printing

A.D.S.	$45,000
Appraisal Cards (4,000,000)	$50,000
Other Reporting/Control Forms	$10,000
Sub-Total	$105,000

12.1.3. Programme Maintenance

Quality Control	$ 1,000
S.A.S.	$ 3,000
T.R.A.P.	$ 2,000
Enumeration	$ 2,500
University Trainee/Mapping	$ 3,000
Tax Shift	$ 1,000
Others	$ 5,000
Sub-Total	$17,500

12.1.4. Data Collection - MEN		$20,000
	Sub-Total	$20,000
12.1.5. Stationery/Supplies		$ 2,500
	Sub-Total	$ 2,500
12.1.6. Equipment		$ 2,000
	Sub-Total	$ 2,000
12.1.7. Input/Output Conversion Cost		$ 3,000
	Sub-Total	$ 3,000
12.1.8. In-Service Training		$13,350
	Sub-Total	$13,350
12.1.9. Grand Total		$224,350

12.2. Field Office Cost Concerns

12.2.1. Regional Office Forms		$ 9,000
	Sub-Total	$ 9,000
12.2.2. Equipment		$50,000
	Sub-Total	$50,000
12.2.3. Conversion		
Appraisal cards (18,726 man/hrs @ estimated $2.32 /hr)		$43,500
Sales/Planning/Building permits		$13,000
Deed/Property Descriptions		$13,000
Maps (Cost for converting linked maps to I.S.O. Standards only)		$700,000
Assessment Roll Property Description (Batch change cost)		$25,000
Others		$30,000
	Sub-Total	$824,500

12.2.4.	Other Miscellaneous Conversion Cost	$80,000
	Sub-Total	$80,000
12.2.5.	Grand Total	$ 963,500

12.3. Total Division Conversion Estimate

This estimate sums both central and field incurred conversion costs. As is part of this costing exercise, costs which can be absorbed as part of the normal operating/amendment/ updating process are excluded.

This total cost structure is intended to cover a three-year conversion period, with juxtapositions of Hard/Soft Conversion approaches.

Head Office conversion cost estimate	$224,350.00
Field Office coversion cost estimate	$963,500.00
Division estimate	$1,187,850.00

13. Summation

13.1. Macro and Micro Metric Concerns

The Metric Study Team drew the following tentative conclusions on the basis of its findings:-

13.1.1. The impact of Metric conversion on the Division will be largely psychological since the scope of change is comparatively narrow in relation to many other public and private organizations.

This is not to say that the implications of conversion and its magnitude do not require timely and creative responses. These responses converge on pre-conversion planning, coordination and training, recapitulated briefly below.

More significantly, the Metric Study Team discerned that few structural adaptations will be required to accommodate the forthcoming changeover in field operations.

This applies to the Division's relations with its client/user groups.

13.1.2. The Synchronized Conversion approach should be chosen by the Division to avoid premature conversion costs.

Within this, it is a decided advantage for the Division to Unilaterally Metricate its mapping operation since all maps prepared between now and "Metric Day" will require wholesale conversion. Unilateral Metrication will short-circuit double preparation of maps and stabilize time/cost outlays.

13.1.3. The Division should select Soft Conversion methods for record management. This means that records are brought within Metric standards only when they are activated during the normal course of operations. This applies specifically to Appraisal Cards and maps.

13.1.4. The Division needs to examine its various procedure/methods development components to ensure that these possess Metric capability.

The Standard Assessment System is one such component among others which can benefit from pre-conversion coordination.

13.1.5. Since the assessment operation is not characterized by heavy capital equipment investment, its Metric conversion costs are primarily focused on clerical functions. These costs may be kept to a minimum if all pre-Metric inventory of supplies are exhausted before conversion.

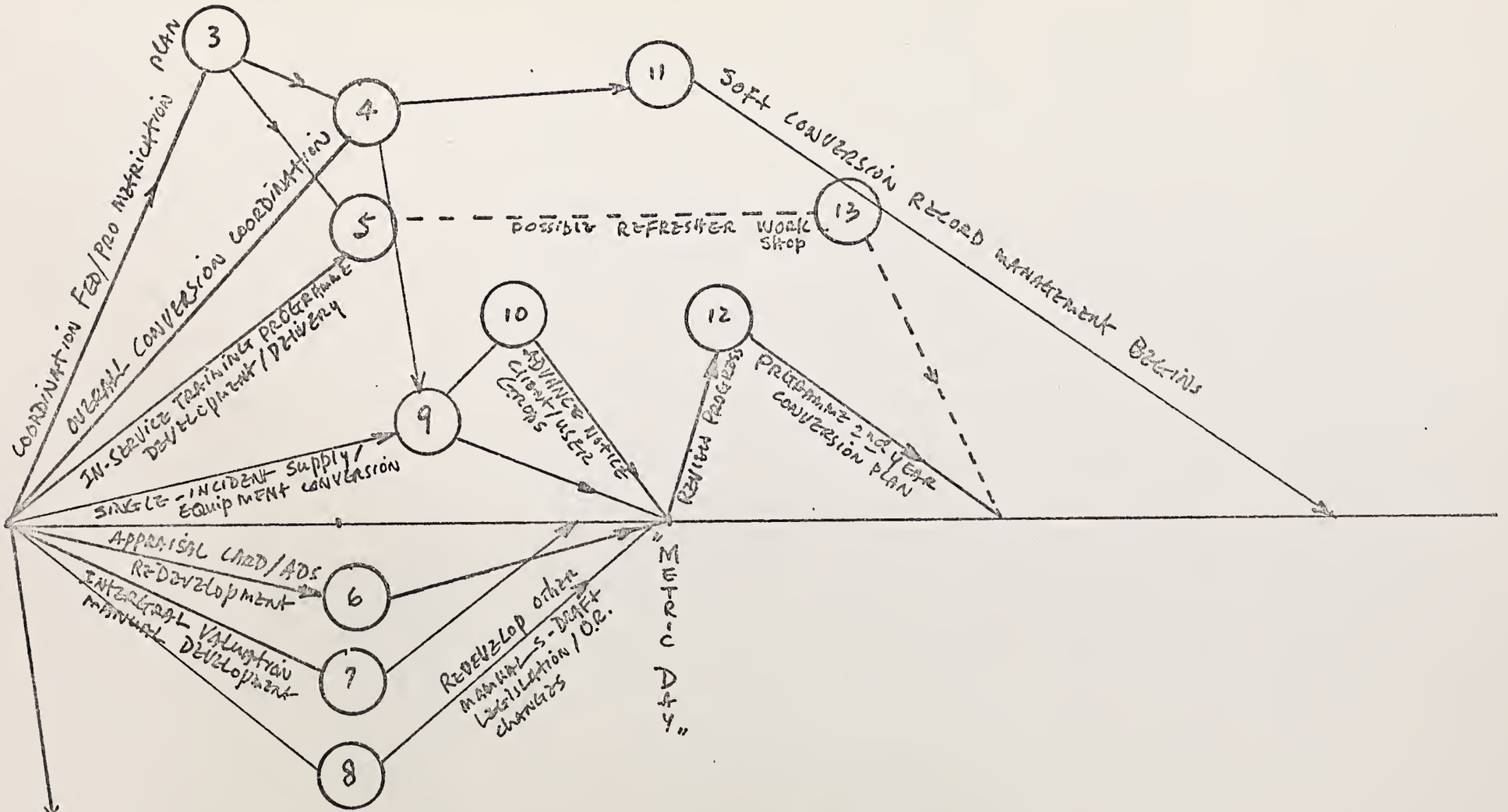
13.1.6. The Division should develop an in-service training package to meet its own specific technical needs and to supplement national and provincial socialization programmes which are focused on the macro level.

13.1.7. Client/user groups of assessment output do not constitute a significant constraint on the Division's eventual conversion. Even in the case of unilateral conversion, the Division need only notify its client/user groups in advance.

13.2. Conversion Time Table

An elapsed time metrication schedule has been compiled on the basis of the Division's conversion capability. Other criteria used in the tentative schedule are congruent with the underlying assumptions applied through this report.

Tentative Conversion Schedule For The Assessment Division



APPENDIX 1.

Data Collection Instruments

1.1 Advance questionnaire

1.2 Data Collection Forms

Ontario

Ministry of
Revenue

Parliament Buildings
Toronto Ontario
M7A 1X8

June 4, 1973.

MEMORANDUM TO:

FROM: A. N. MacKay,
Director,
Assessment Standards Branch.

SUBJECT: Metric Conversion Planning Visit

The planning for metric change within the Assessment Division has been assigned to the Assessment Standards Branch. Metric conversion refers to the replacement of Imperial measurements by S.I. or International System of units. A survey of the issues, advantages and government positions specific to this change is offered in "The Long and Short of Metrication" (Aspects No. 9, 1972).

The purpose of this questionnaire is to gather the inventory and operational data which could be used for costing, scheduling, and overall planning. The questionnaire is circulated to you in advance to provide some indication of the scope of data needed for the study. At the time indicated below, a study team hopes to visit your office to hear your views on metric conversion and to collect the data.

The Division's plan for metrication is concurrent with the larger studies being carried out by both the Federal and Ontario Governments. The commitment to go metric was expressed by a federal government white paper on January 1970, which concluded that the "adoption of the metric system of measurement is ultimately inevitable - and desirable - for Canada". The Ontario Government indicated its support in a white paper published in May 1972.

June 4, 1973

Within the Division, the principal thrust of conversion planning is focused on the technical and operational dimensions of metric conversion. Accordingly, various avenues of metric conversion, their associated costs and schedules will be studied in some detail. Your views on these and other areas will help make the study a success.

A visit to your office by the metric study team is planned for . In your office, the team will seek your views and individually collect data on the five topical areas of the questionnaire. It is hoped that the study team will only take a minimum of your time and manpower resources. Should this date prove inconvenient, or should you have any questions, please contact Mr. W. Wu who can be reached at (416) 965-6414.

A. N. MacKay

ASSESSMENT DIVISION METRIC CONVERSION PLANNING

ADVANCE REGIONAL OFFICE DATA QUESTIONNAIRE

NOTE: PLEASE DO NOT COMPLETE THIS ADVANCE QUESTIONNAIRE. It is prepared to apprise you of the scope of data collection planned for . On this date, a study team from the Assessment Standards Branch will hear your views and complete the data entry.

1. Manuals

1.1 How many of the following manuals are in use in your office?

a) Assessment Valuation Manual: volumes 1, 2 & 3 in one binder.

b) Assessment Valuation Manual: volume 1 - residential

c) Assessment Valuation Manual: volume 2 - commercial

d) Assessment Valuation Manual: volume 3 - farm

e) Assessment Valuation Manual: volume 4 - institutional

f) Data Collection Code Book

g) Data Collection Manual

h) Condominium Valuation Manual

i) Standard Assessment System Manual

j) Enumeration Manual

1.2 Are there any manuals in use in your office that are not listed above?

1.2.1 What are the names of these manuals?

1.2.2 What code numbers, if any, refer to the manuals not listed in 1.1?

1.2.3 What is the manuals function/purpose?

1.2.4 If the manual is not prepared by the assessment Division, who is the designer/supplier?

1.2.5 When was the manual prepared/published?

1.2.6 What are the pages' dimensions; how many pages are there?

1.2.7 What is the quantity in use now?

2. Forms (excluding appraisal cards)

2.1 Following is a sample list of forms - the sources of which are external to the Assessment Division. The input source is also listed.

Input Source	Input Item
Assessment Review Court	Notice of Appeal Notice of Hearing Notice of Decision A.R.C. Court Record A.R.C. Court Report
Municipal Building Inspector	Building Permit List of Building Permits
Registry of Land Titles Office	Transfer/Deed/Indenture
Teela Marketing Surveys	Teela Work Sheet Teela Card

Ammend this list as necessary so that it will clearly enumerate all external sources of information used by your office. For each addition give all possible names by which the form is recognized by both suppliers and users, and any form number identified with the form.

2.2 Following is a sample list of forms used for reporting to agencies/persons external to the Assessment Division. The user name is also listed.

User Name	Output Item
Assessment Review Court	Notice of Appeal
Lawyers	Division of Assessment Form (Property Split Forms)
Municipal Clerk	Alphabetical Names List Alphabetical Street List Assessment Roll Assessor's Return Apportionment Form Division of Assessment Form Municipal Enumeration Notice Supplemental Assessment Roll Teela Card Voters Edit List (Census List) School Support listing
Municipal Subsidies Branch T.E.I.G.A.	Assessor's Return
Private Organizations	Teela Card
Property owner/Business tenant	
School Boards	School Support List

Amend this list as necessary so that it will clearly enumerate all external users of information supplied by our office. For each addition give all possible names by which the form is recognized by both suppliers and users, and any form number identified with the form.

2.3 Following is a comprehensive list of the forms that are in common usage.

Function	Form Name
Appeals	Notice of Decision Notice of Hearing Sitting Master Control Form
Apportionments	Division of Assessment Form
Data Entry	Assessment Data Sheet Error Listing/Total Report Keypunch Control Form - (Update Master Control)
Enumeration	Alphabetical Names List Alphabetical Street List Assessor's Return M.E.N. Form - School Support List Voters Edit List
Reporting	Assessment Roll Assessment Notice
Sales	Sales Record Listing Teela Cards Teela Work Sheet Transfer/Deed/Indenture
Supplementals	Building Permit Building Permit List Expediting/Updating Sheet Supplemental Assessment Roll Supplemental Assessment Sheet Supplemental Notice (43/44) Supplemental Progress Ledger

Amend this list without repeating any modifications to lists 2.1 and 2.2, so as to complete a listing of all forms used by your office. For each addition give all possible names by which the form is recognized by both suppliers and users and any form number identifying the form.

2.4 Please indicate the appropriate form dimensions.

2.5 If the form is not prepared by the Assessment Division, who is the designer/supplier?

2.6 What is the approximate number of forms handled/completed by your office per year?

2.7 How are the forms prepared and/or processed? Include a brief description of how the data is manipulated/compiled/reworked into its final form. Manpower requirements? Manpower allocations?

2.8 What is the average number of imperial unit entries that appear on the form?

2.9 Are computer tapes or similar storage media employed to store the data on the form? If so, please specify method, volume and process frequency.

3. Appraisal Cards

3.1 Following is a list of appraisal cards:

Residential

Apartment/509

Commercial-Industrial/510

Farm/511

Commercial/512

Industrial/513

Condominiums

If there are any other forms/cards used by your office in the appraisal function add them to the list above. For each addition give 1) all possible names by which the form/card is recognized by both suppliers and users, 2) any form number identified with the form/card, 3) the dimensions of the form/card and 4) the supplier of the form/card if it is not prepared by the Assessment Division.

3.2 What is the approximate number of forms/cards handled/completed by your office per year?

3.3 What is the average number of imperial unit entries that appear on the form/card?

3.4 Are computer tapes or similar storage media employed to store the data recorded on the form/card? If so, please specify method, volume and process frequency.

4. Maps

4.1 How many maps do you have in your office? Specify the map's dimensions and the map's scale ratio.

5. Office Supplies/Equipment

5.1 List all office supplies and office equipment which must be replaced in metric conversion. Some of these are: measuring tapes, rulers, folders, 3-hole punches, binders, stationary, filing cabinets, map storage cabinets, drafting equipment etc.

5.2 What is the quantity of each item in your office?

5.3 What are the catalogue numbers by which the supplies and equipment can be reordered?

MINISTRY OF REVENUE
ASSESSMENT DIVISION

DATA/COST TABLE: OFFICE FORMS - ASSESSMENT SERVICES

FOR: METRIC CONVERSION STUDY

RESPONDENT:

PREPARED BY:

DATE:

FORM NO.	NAME *	DIMENSIONS	QUANTITY OF FORMS USED/YR.	IMPERIAL ENTRIES PER FORM	MANUAL CON./ENTRY		EDP CON./ENTRY		CONVERSION COST EST.	
					TIME EST.	COST EST.	TIME EST.	COST EST.	MANUAL	EDP
	Appeals Control Form									
	A.R.C. Court Record									
	A.R.C. Court Report									
	Assessment Notice									
	Notice of Appeal									
	Notice of Decision									
	Notice of Hearing/Sitting									
	Division of Assessment Form									
	Assessment Data Sheet									
	A.D.S. Update Control									
	Assessment System Updates									
	Error Listing/Total Report									
	Alphabetical Names List									
	Alphabetical Street List									
	Assessor's Return									
	M.E.N. Form									
	School Support List									

* NOTE ON REVERSE IF FORM NOT PREPARED BY DIVISION

MINISTRY OF REVENUE
ASSESSMENT DIVISION

DATA/COST TABLE: OFFICE FORMS - ASSESSMENT SERVICES (2)

FOR: METRIC CONVERSION STUDY

RESPONDENT:

PREPARED BY:

DATE:

FORM NO.	NAME *	DIMENSIONS	QUANTITY OF FORMS USED/YR.	IMPERIAL ENTRIES PER FORM	MANUAL CON./ENTRY		EDP CON./ENTRY		CONVERSION COST EST.	
					TIME EST.	COST EST.	TIME EST.	COST EST.	MANUAL	EDP
	Voters Edit List									
	Voters List									
	Assessment Roll									
	Sales Record Listing									
	Deed/Indenture									
	Transfer									
	Supplemental Progress Ledger									
	Monthly Total Report									

* NOTE ON REVERSE IF FORM NOT PREPARED BY DIVISION

MINISTRY OF REVENUE
ASSESSMENT DIVISION

DATA/COST TABLE - SECTION NAME:					RESPONDENT:					
FOR: METRIC CONVERSION STUDY					PREPARED BY:				DATE:	
CODE NO.	NAME	DIMENSIONS	QUANTITY	IMPERIAL ENTRIES	MANUAL CON./ENTRY		EDP CON./ENTRY		CONVERSION COST EST.	
					TIME EST.	COST EST.	TIME EST.	COST EST.	MANUAL	EDP
	Manual									
	Data Collection Code Book									
	Teela									
	Building Permits									
	Assessment Data Sheet									
	A.D.S. (Supplementals)									
	Appraisal Cards									

* NOTE ON REVERSE IF FORM NOT PREPARED BY DIVISION

MINISTRY OF REVENUE
ASSESSMENT DIVISION

DATA/COST TABLE: OFFICE SUPPLIES/EQUIPMENT FOR: METRIC CONVERSION STUDY			RESPONDENT: PREPARED BY:				DATE:	
ITEM NAME	DESCRIPTION/PURPOSE	USED BY SECTION	CAT. NO.	QUANTITY IN USE	CONVERT NOW ?	COST/ITEM	METRIC COST/ITEM	TTL. HARD CON. COST

MINISTRY OF REVENUE
ASSESSMENT DIVISION

MAPS SUMMARY FOR: METRIC CONVERSION STUDY									REGIONAL OFFICE: PREPARED BY:					DATE:		
SCALE / DIMENSIONS	1"=40'	1"=100'	1"=200'	1"=400'	1"=800'	1"=1000'	1"=1320'									
30 X 40																

APPENDIX 2

User Survey

2.1 Questionnaire

2.2 Sample Response.

Ontario

Ministry of
Revenue

Parliament Buildings
Toronto Ontario
M7A 1X8

June 11, 1973.

Dear Sir:

The Assessment Division of the Ministry of Revenue is preparing for metric change based on the S.I. or International System of Units. The purpose of this survey is to discover how this proposed change in data format will affect your use of our output.

This plan for metric conversion is concurrent with the larger studies being carried out by both the Federal and Ontario Governments. The commitment to go metric was expressed by a federal government white paper on January 1970, which concluded that the "adoption of the metric system of measurement is ultimately inevitable - and desirable - for Canada". The Ontario Government indicated its support in a white paper published in May, 1972.

The principal thrust of our planning is focused on the technical and operational dimensions of metric conversion. Each of these has its internal and external ramifications. Externally, document formats will differ from those based on Imperial measurements. For example, a metric paper size known as A4 will probably be used to replace today's letter and legal sizes. Concommitantly, measurement data will be reported in metric units. These raise a set of questions which occasioned this part of the study: how will these changes affect the ways in which you use our report data? Would the Division's conversion timing be an important consideration in your operations? Do you have any plans for a similar change? If you are not yet in a position to develop a conversion plan, how can the Division maintain its existing service to you when it does go metric?

June 11, 1973.

The attached questionnaire is organized into three parts, each of which focuses on one significant aspect of change. All three parts hope to seek answers which will help us maintain and enhance the existing level of service to you. Accordingly, it will be appreciated if you will complete and return the questionnaire by July 20, 1973. Enclosed is a self-addressed envelope for your convenience. Should you have any questions, please contact Mr. W. Wu who can be reached at (416) 965-6414.

Yours truly,

A.N. MacKay,
Director,
Assessment Standards Branch.

USER REACTION TO THE PLANNED METRIC CONVERSION OF THE ASSESSMENT DIVISION

1. How will the planned metric conversion of the Assessment Division affect you?

   1.1 In what ways would your operations be affected by our use of metric paper sizes?

   1.2 How will you accommodate this change?

   1.3 How would your operation be affected by metric data in our future reports?

   1.4 What changes are necessary to use metric data?

   1.5 What costs are likely to be incurred by these changes?

   1.6 Any other areas affected? (Please List)

   1.7 Your general reactions to our possible metric change? Will the change be beneficial to your operations in the long run?

2. How will the method/timing of conversion of the Assessment Division affect your operations?

2.1 It is possible that a dual system of measurement will be used for a short period to phase-in the metric system throughout the province. Do you favour this approach?

☐ Yes ☐ No

☐ Others? (please suggest)

_____

_____

_____

2.2 If the dual system conversion method is used, what in your opinion is a reasonable phase-in period for your purposes?

_____

_____

_____

2.3 It seems equally likely that a no-lag or "instant" metric conversion method be applied in parts of the provincial government. In this eventuality, how may the Assessment Division maintain its existing level of service to you?

_____

_____

_____

2.4 How much advance notice do you need to convert your input consumption procedures, if the Division goes metric?

_____

_____

_____

2.5 Would the metric conversion of the Assessment Division be a significant consideration in your overall operations?

☐ No

☐ Yes, in the following ways

_____

_____

_____

2.6 Other comments and suggestions.

_____

_____

_____

3. In what ways is your establishment preparing for metric conversion?

3.1 How are the implications of metric conversion for your establishment being studied? By what unit?

_____

_____

_____

3.2 What types of conversion method are being investigated?

_____

_____

_____

3.3 Have you developed conversion schedule(s)?

☐ No

☐ Yes; schedule(s)

_____

_____

_____

3.4 Will your conversion scheduling be coordinated with federal/provincial conversion timetables?

☐ Yes ☐ No

3.5 Is your metric conversion contingent on factors external to your operations?

☐ No

☐ Yes, in the following ways

_____

_____

_____

3.6 When will your plans reach the activation stage?

3.7 Will your establishment budget for reconverting input data from one form to another where necessary for input consumption? What formula is relevant to data outputs from the Assessment Division?

3.8 Other comments and suggestions.

USER REACTION TO THE PLANNED METRIC CONVERSION OF THE ASSESSMENT DIVISION

1. How will the planned metric conversion of the Assessment Division affect you?

1.1 In what ways would your operations be affected by our use of metric paper sizes?

Form letters to be reprinted. All forms to be redesigned.

Envelope sizes to be changed. (Windows etc)

New accounting binders to be ordered.

1.2 How will you accommodate this change?

If we know when the system is to be put in, we could start ordering of supplies, forms, etc 3 to 6 months in advance. We will gradually phase in as we reorder based on the new metric size.

1.3 How would your operation be affected by metric data in our future reports?

There would be needed time of Managers and Supervisors being trained and becoming familiarized with the Metric System and then the subsequent ~~training of employees. Once put into effect would become a normal~~ day to day operation.

1.4 What changes are necessary to use metric data?

This would be a matter of an employee education programme.

Redesigning of Forms.

Some EDP Programming Changes.

1.5 What costs are likely to be incurred by these changes?

The costs would be difficult to estimate as the forms we use are printed by our own printing unit and it would be a matter of ordering ~~in metric size. As far as the accounting binders are concerned~~, they too can be ordered in metric size.

1.6 Any other areas affected? (Please List)

a) Print Shop
b) Clerk's Department - maintaining of the Rolls and giving out information
~~c) Property Department - maintaing the roll of Municipal properties and re~~
lating assessment information to them.
d) Planning Department
e) Possibly the Building Department - particularly in issuance of permits.

1.7 Your general reactions to our possible metric change? Will the change be beneficial to your operations in the long run?

Change in the long run is desirable. Like all change it means extra work for Management and Supervision and probably for that reason there may be ~~a tendency to avoid it.~~ The inevitable long run is that the change is inevitable and desirable. It would only be beneficial if everybody in t Province used the Metric System (including companies, etc). ~~If~~ all emplo

2. How will the method/timing of conversion of the Assessment Division affect your operations?

2.1 It is possible that a dual system of measurement will be used for a short period to phase-in the metric system throughout the province. Do you favour this approach?

☒ Yes ☐ No

☐ Others? (please suggest)

X This will act as an educational programme and for that reason is desirable.

2.2 If the dual system conversion method is used, what in your opinion is a reasonable phase-in period for your purposes?

Reasonable phase-in period would be 6 months to 1 year or until the whole of Canada is using it. (White paper reports that this will be ~~from 5 to 25 years).~~

2.3 It seems equally likely that a no-lag or "instant" metric conversion method be applied in parts of the provincial government. In this eventuality, how may the Assessment Division maintain its existing level of service to you?
If the Borough does not change to metric the same time as the Province, ~~I can foresee utter chaos because when the Borough employee phones the~~ Assessment Office, they, (Province), would have to remember to convert from the system presently used to the metric system or vice-versa.

2.4 How much advance notice do you need to convert your input consumption procedures, if the Division goes metric?

I think there should be at least 2 year's notice before going to the Metric System.

2.5 Would the metric conversion of the Assessment Division be a significant consideration in your overall operations?

☐ No

☒ Yes, in the following ways

Assessment figures (for controls) Roll Number, etc. and other various data that uses the Metric System.

2.6 Other comments and suggestions. Before going into the Metric System the Province or Federal Government should hire enough staff in order to ~~man every school, High School and University to instruct everyone~~ in the Province (those working for Companies, municipalities, etc) in the Metric System so that when the final change is made, it would not be so confusing. ~~Also advertising in the newspapers would be of some help to those~~ unable to attend classes.

3. In what ways is your establishment preparing for metric conversion?

3.1 How are the implications of metric conversion for your establishment being studied? By what unit?

Printing Section of Purchasing Division of Treasury are starting to implement Metric Conversion by going letter size and eventually with a ~~view to converting as many forms as possible in the ordering of~~ envelopes. Tax are aware of the possibility of the change through this report and will follow the lead set by the Assessment Department.

3.2 What types of conversion method are being investigated?

Has not been decided upon as of this date

3.3 Have you developed conversion schedule(s)?

☒ No

☐ Yes; schedule(s)

Dependant on when the Assessment Division will convert.

3.4 Will your conversion scheduling be coordinated with federal/provincial conversion timetables?

☒ Yes ☐ No

3.5 Is your metric conversion contingent on factors external to your operations?

☐ No

☒ Yes, in the following ways

Dependant on the Standard Assessment System and its conversion to the Metric System.

3.6 When will your plans reach the activation stage?

2 years after the go-ahead as indicated in item 2.4.

3.7 Will your establishment budget for reconverting input data from one form to another where necessary for input consumption? What formula is relevant to data outputs from the Assessment Division?

Yes. Probably having no choice once the Province sets the pace.

3.8 Other comments and suggestions.

Carry out an extensive educational programme. Prepare public, municipalities, companies, general public for the new system with a target date.

APPENDIX 3

Cost Computations for Single-incident Replacement Items

1. Equipment
2. Transfer, Building Permit and Appraisal Card Conversion.

MINISTRY OF REVENUE
ASSESSMENT DIVISION APPENDIX 3.

DATA/COST TABLE: OFFICE SUPPLIES/EQUIPMENT

FOR: METRIC CONVERSION STUDY

RESPONDENT: "Typical" Regional Assessment Office.

PREPARED BY: J.W.

DATE: 9/19/73

ITEM NAME	DESCRIPTION/PURPOSE	USED BY SECTION	CAT. NO.	QUANTITY IN USE	CONVERT NOW ?	COST/ITEM	METRIC COST/ITEM	TTL. HARD CON. COST
Vertical Vemco Scale 12"	drafting machine			3	x		$ 9.50	$ 28.50
Horizontal Vemco Scale 18"	drafting machine			3	x		12.25	36.75
Architect Scales				22	x			
Engineer Scales				33	x		5.00	165.00
					x			
Measureing tapes	100'			32	x		15.40	492.80
	50'			53	x		12.50	662.50
	16'			19	x			
Rulers	15"			8	x		.49	3.92
	12"			71	x		.14	9.94
	6"			22	x			
3-hole punch				7	x		7.72	54.04
Postage machines	Pitney Bowes 5103			.833	x		27.00	22.49
	Friden 3111			.167	x		30.00	5.01
								1,480.95

APPENDIX 4

Brief on Metric Scales
submitted to the
Sudbury Planning Board.

The urgent need to define assessment map scales and paper sizes for the Division is dramatically demonstrated by a unique situation in Sudbury. The Planning Board of the regional government of Sudbury and Inco mines - a significant force in the area - are currently mapping and surveying in the metric system. This has created the horrendous situation whereby Metric data taken from these sources by the Regional Assessment Office are being reconverted to the Imperial System for mapping purposes.

This regression clearly indicates a need to re-examine the Division's mapping policy with a view to encourage a uniform standard to be adopted by the client groups of the Division.

Internally, the tolerance of the current Sudbury situation will appreciably increase the time/cost dimensions of the mapping operation. On a province-wide basis, continuing preparation of assessment maps according to Imperial standards will further widen Metric conversion since all maps prepared during this waiting period will not conform to requirements of the future.

The Sudbury Planning Board brief is appended here to illustrate the need for Divisional mapping policy action.

DAVID HUGHES
TO: PLANNING BOARD
SUDBURY.

SCALE STANDARDIZATION
(Metric System)

The function of any scale standardization scheme is that is will serve as a central pool for the selection of scales, and scales which are not included would not be used. The scheme therefore, must be sufficiently pliable and rich in variety to satisfy all potential requirements.

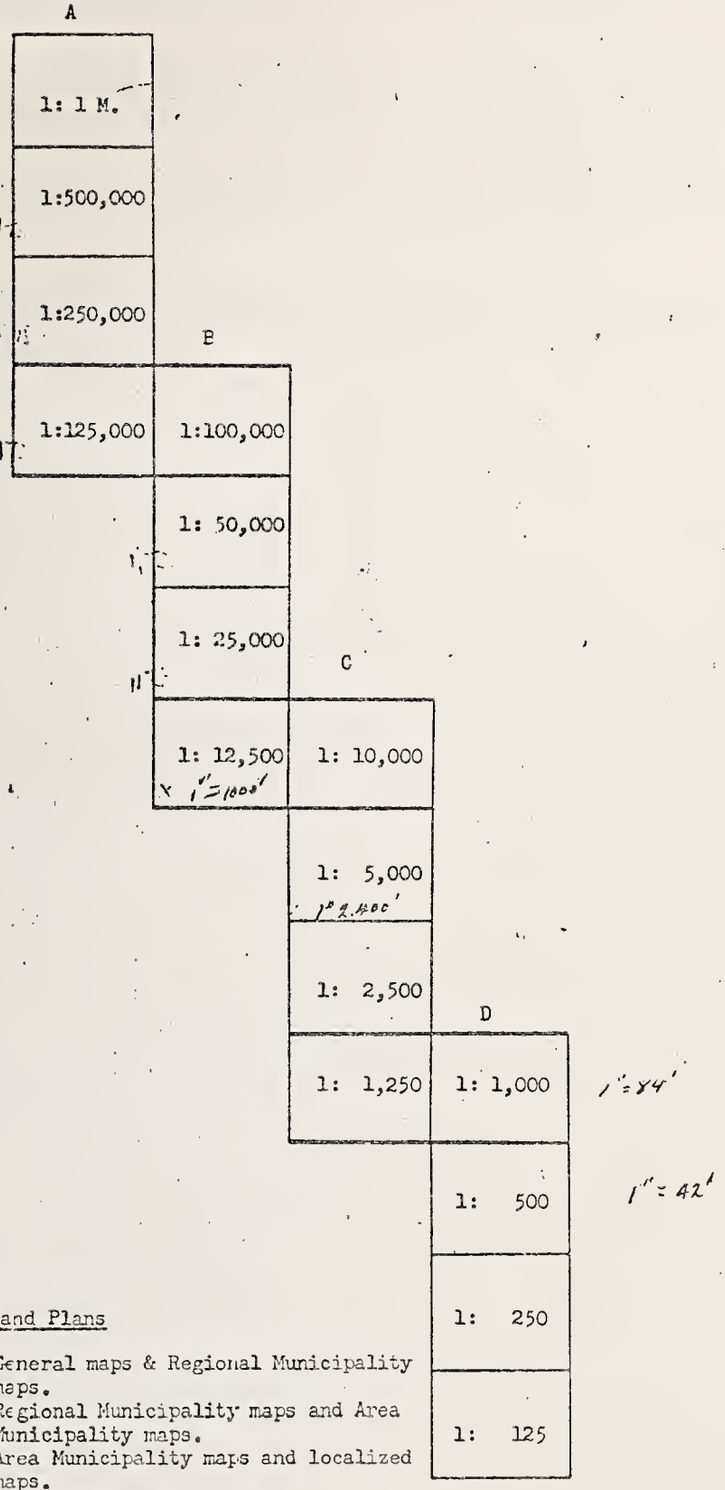
The commonly used principle of derivation of scales is one of duplication which usually consists of multiplying the scale factor by 2. By this method, a map on a certain scale, when reproduced on a double scale, transforms one map into four sheets, each sheet being the same size (and possibly the same form) as the original map.

Other derivation factors are possible and have to be considered as one factor is insufficient for a scheme to be of real use. The only factors to be considered are 3 and 5. It is not advisable to use both these factors in conjunction with factor 2, as the resulting combinations 2 and 3 and 2 and 5 are the bases of two different systems of numeration. The exclusion of factor 3 is advisable, as derivations of scales would not be explicit, e.g. 1:10,000 enlarged 3 times would be 1:3333.3333. Therefore, 2 and 5 are chosen as the most efficient factors.

The selection of these factors results in a two dimensional scheme from which the appropriate scale ranges may be chosen.

1 M	1:200,000	1:40,000	1:8,000	1:1,600	1:320
1:500,000	1:100,000	1:20,000	1:4,000	1: 800	1:160
1:250,000	1: 50,000	1:10,000	1:2,000	1: 400	1: 80
1:125,000	1: 25,000	1: 5,000	1:1,000	1: 200	1: 40
1: 62,500	1: 12,500	1: 2,500	1: 500	1: 100	1: 20
		1: 1,250	1: 250	1: 50	1: 10
2			1: 125	1: 25	1: 5
		5			

From this two dimensional scheme, the following is abstracted to form our Scale Standardization Scheme.



Maps and Plans

A. General maps & Regional Municipality maps.
B. Regional Municipality maps and Area Municipality maps.
C. Area Municipality maps and localized maps.
D. Localized maps.

N.B. The two scales between the heavy lines may co-exist, or either may be chosen as the transfer scale from one range to the next.

Localized maps will include engineering plans, site plans, subdivision layouts and topographic bases.

C. Area municipality maps will include "topic map" such as Ward boundaries, street maps: property maps (at their smallest scale) and topographic bases.

B. Regional Municipality Mapping will include "topic maps", outline maps, distribution maps, etc.

A. General Maps - These would be directly derived from N.T.S. sheets and used as location maps, etc.

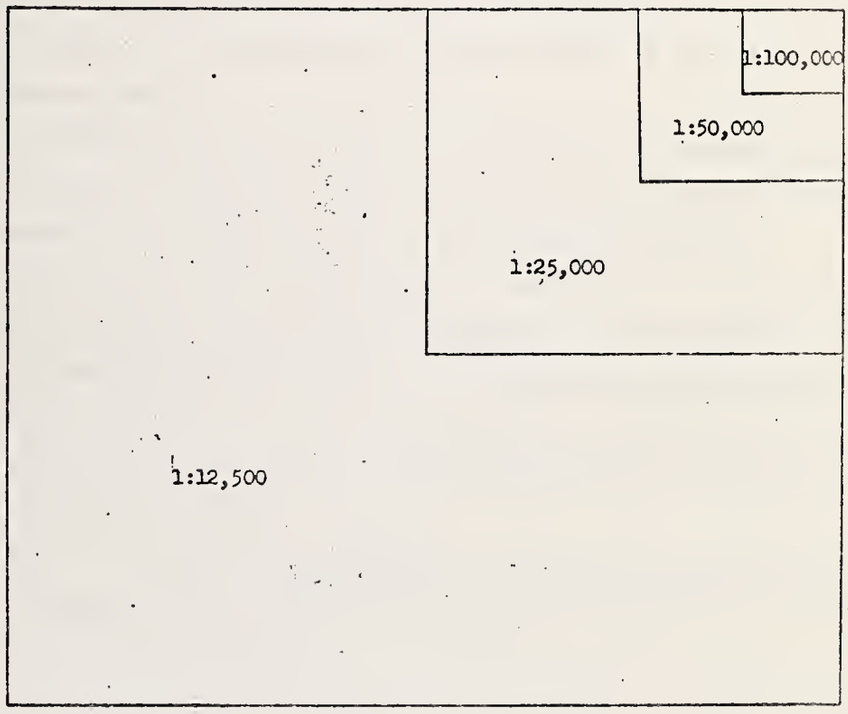
SHEET SIZE STANDARDIZATION

The selection of stnadard sheet sizes is dependant on a number of factors:

1. The area to be mapped.
2. The scale of mapping.
3. Additional marginal data.
4. The selection of Standard Scale derivation factors.

If it is assumed that scales are standardized and that within each type of map there is a limited selection of these scales at a derived factor of 2, then for each "topic set", a standard sheet size may be determined.

e.g. Set "B" Scale Standardization.



With sheet size originating at the smallest scale 1:100,000 the sheet size for a hypothetical map might be 20" x 10". If it is enlarged 1:2, the sheet size then becomes the same as for the 1:500,000 map. The same applies when this enlargement scale is applie to the 1:50,000 and 1:25,000. This principle would result in only four sheet sizes for th entire scheme. Each map area could be easily identified at the smaller scales.

The selection of the four sheets sizes would depend on the factors stated at the beginning of this paragraph.

REFERENCE STANDARDIZATION

The ideal reference system is one which is easily applied, easily read and not ambiguous within the area for which it is selected.

For each township or municipality, there are many systems which may be applied, i.e. Concession and lots, ward and poll, census division and tract, but the larger the area to be covered, the more unwieldy any of these methods become.

Essentially, a reference system should not change with any administrative or legal changes within an area, but should remain unaltered.

Any lack of uniformity between townships or municipalities results in difficulties in comparative analysis, duplication in many areas of data collection and inadequacies in using reference locations for data processing.

A reference system would therefore, be best achieved by a coordinate grid reference system.

A coordinate system is a pattern of correlated physical monuments established on the surface of the earth to a predetermined precision and assigned "X" and "Y" coordinate values in accordance with a particular grid and projection.

The 1" to 200' city topographic maps are based on the Universal Transverse Mercator Projection and superimposed on these maps is the Ontario Grid.

The National Topographic Sheets are also based on the Transverse Mercator Projection so the grid can easily be added to these, and any other maps as need arises. (There is Provincial legislation permitting the introduction of grid coordinates for official purposes.)

The natural extension in the use of this system would be its adoption as a method of property survey (Fig. 3) and records, and as the instrument for data collection for data processing.

Fig. 4 indicates the grid coordinate system overlying the 1" to 200' topographic map.

Fig. 5 indicates the grid coordinate system superimposed on a 1" = 1000' City Ma

It will be noticed that the grid lines are vertical and horizontal to map edges so there is no difficulty in legibility.

The grid system can be applied to maps and plans in either metric measurement or feet, so that maximum flexibility may be obtained.

For engineering purposes, a coordinatograph would greatly facilitate plotting of surveys written in this form and would speed the production of this type of mappin as well as simplifying the procedure of plotting the system on maps of all scales.

For each scale chosen, there would be an optimum grid interval - in Fig. 4, it is 1000' - on a metric scale it would be 1000 metric. In Fig. 5, the interval is 5000' and similarly, could be converted into the metric scale. With the consistancy and accuracy that this method gives, a point on a map at one scale could be accurately located on other maps containing the grid system.

At the present time, no use is made of a reference system other than that of concession and lot for street maps. This is not adequate for reasonable accuracy of location or data storage.

FIG 3

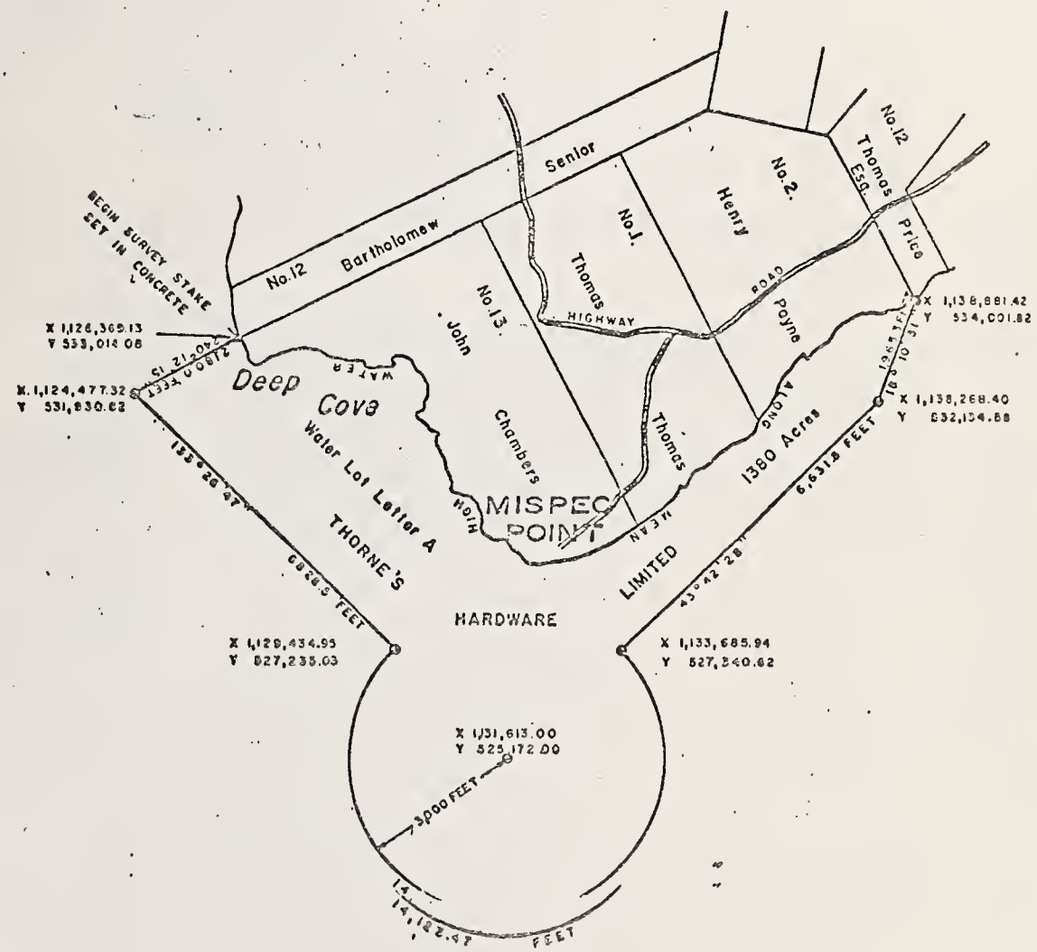
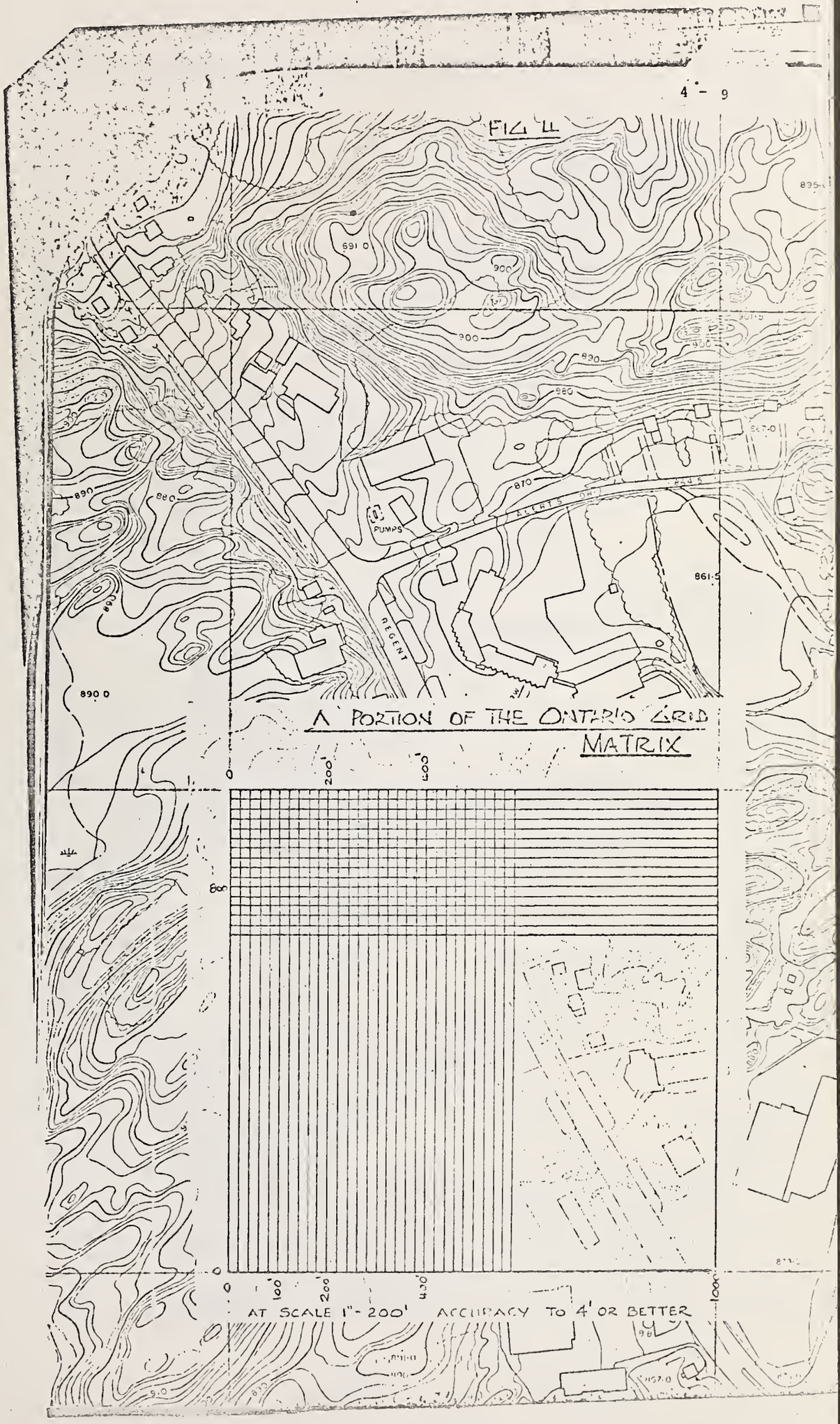


FIG 11



A PORTION OF THE ONTARIO GRID MATRIX

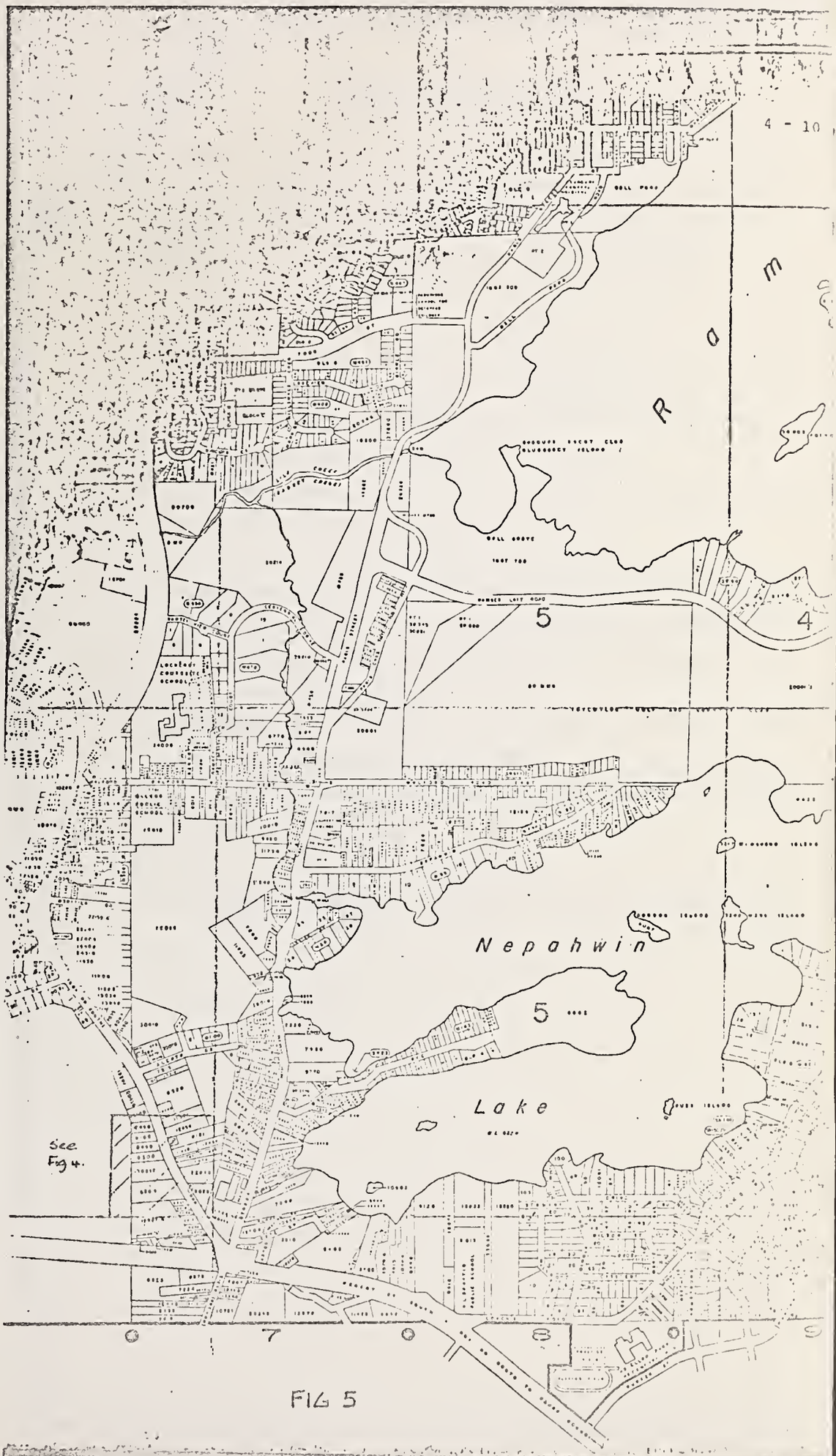


FIG 5

ZONING MAP AND ZONING BY-LAW

The small scale Zoning Map at 1" = 1000' has proved adequate for general requirements and public demand. However, with the Zoning By-law in the process of revision, it has been stated that an enlarged form of the Zoning Map is required and that each amendment to By-law 62-192 be easily identified.

In order not to become unwieldy, this would require separate sheets covering the whole of the City.

To achieve this end economically, the following principle could be implemented:

1. A cronaflex original conforming to the proposed city atlas. (see Fig.6) sheets which will be our master copy for zoning amendments as well as maintaining the general zoning map at 1" - 1000'.
2. Each master sheet would be broken down in one of two ways into sub-sheets (Fig. 7): (a) by concession and lot
   (b) by Ontario grid coordinate squares.
3. Amendments would be added to each of the master sheets as appropriate. Where the amendment affects one or more sub-sheets, a sub-sheet would then be made (see Fig. 8) and entered into the Zoning By-law so that it is kept totally updated.
4. So that each amendment may be easily identified,a number would be allocated to it on the sub-sheet. e.g. R3-32 (1).
5. On a master index for each master sheet, this amendment would be cross-indexed. It might read:

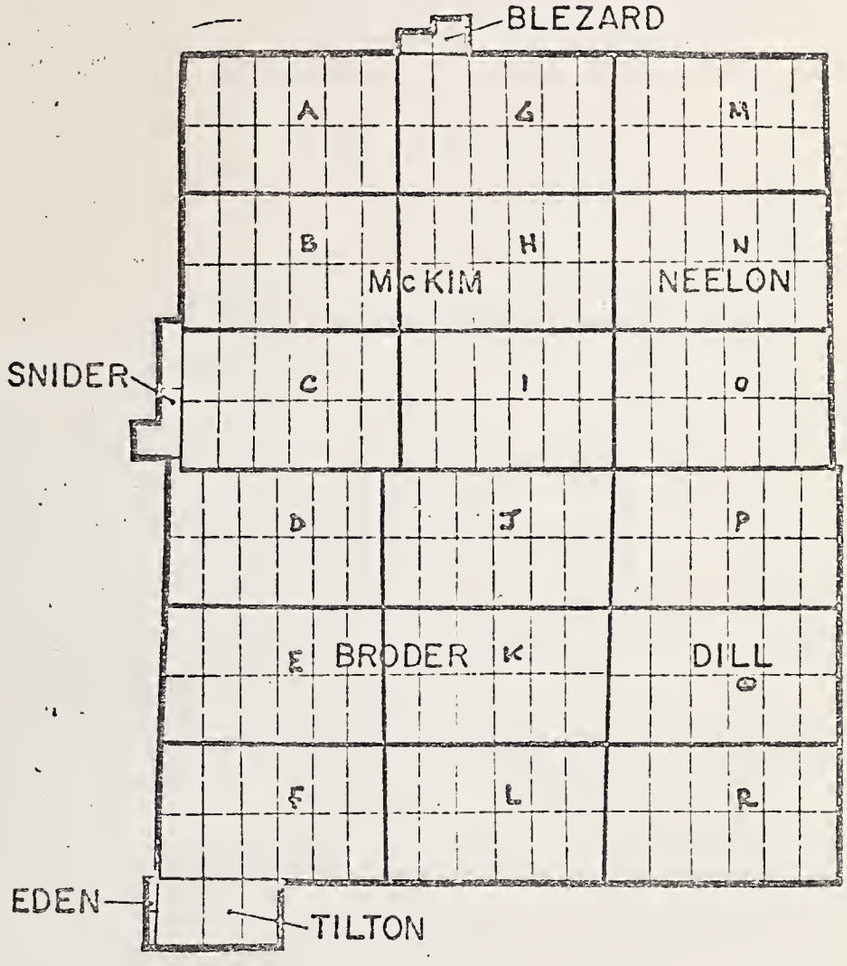
MASTER INDEX N.

Index No.	Index Page	By-law	From	To	Date
1	N 10	72-275	R1	R2	July 20, 1972

FIG 6

AREA MUNICIPALITY OF SUDBURY
TOWNSHIPS

SCALE 1"=2 MILES



LARGE SCALE MAP DIVISIONS IN CITY

PREPARED BY THE SUDBURY PLANNING BOAR

FIG. 7

MASTER SHEET AND SUB-SHEETS

N

1	2	3	4	5	6
7	8	9	10	11	12

This example indicates the use of Concession and Lot lines.

If the Ontario Grid System were employed (the grid interval selected could be 500 metres or feet) it would be necessary to amend the master sheet outlines.

The subsheets would be squares and reference of each zoning amendment would be by grid coordinates.

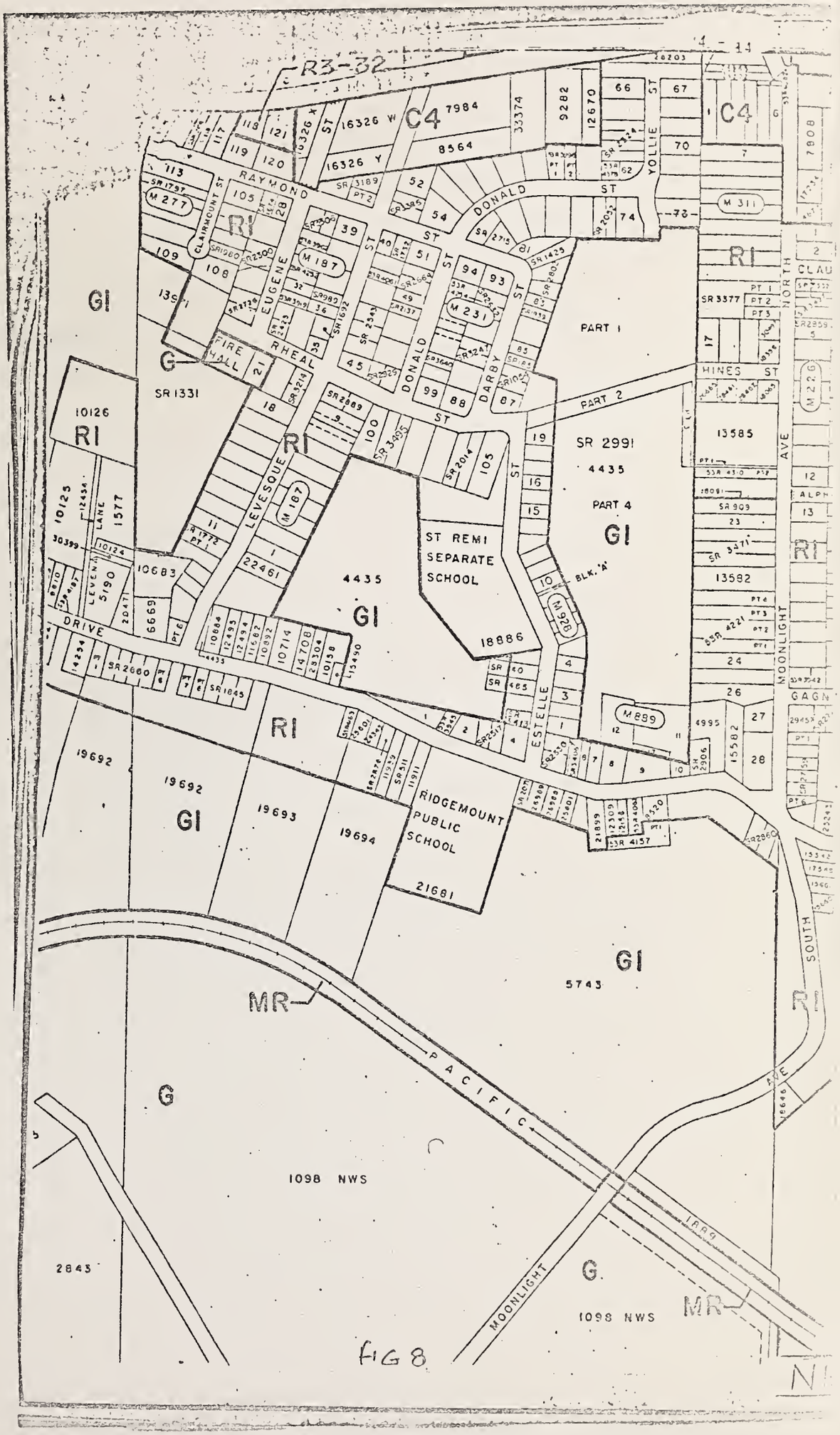

R3-32
C4
7984
16326 W
16326 X
16326 Y
8564
33374
9282
12670
66
67
70
74
YOLLIE ST
RAYMOND ST
DONALD ST
CLAIRMOUNT ST
EUGENE ST
RHEAL ST
DONALD ST
DARBY ST
LEVESQUE ST
ESTELLE ST
NORTH MOONLIGHT AVE
SOUTH MOONLIGHT AVE
HINES ST
DRIVE
PACIFIC AVE
RI
GI
G
MR
FIRE HALL
SR 1331
10126
10125
LEVEN LANE
1577
5190
10683
6669
22461
4435
ST REMI SEPARATE SCHOOL
18886
BLK. 'A'
PART 1
PART 2
PART 4
SR 2991
4435
13585
13582
4995
15582
19692
19693
19694
RIDGEMOUNT PUBLIC SCHOOL
21681
5743
1098 NWS
2845
M 277
M 187
M 231
M 311
M 889
M 926
M 226

FIG 8

APPENDIX 5.

Imperial Unit Reference in
The Assessment Act and
Ontario Regulations

C.32 The Assessment Act

Section Ref.	Imperial units requiring conversion
S.27(8)	400 trees per acre
	300 trees measuring over two inches
	200 trees measuring over five inches
	100 trees measuring over eight inches four and one-half feet
S.29(1)	five acres
S.33(4)	Oil Transmission Pipe Line Table
	Field and Gathering Pipe Line Table
	Gas Transmission Pipe Line Table

NAME OF ACT: ASSESSMENT ACT

REGUALTION NO. - DATE	REFERENCE CITATION
O. Reg. 302/70 Made - July 6/70 Filed - July 7/70 Gazetted - July 18/70	-
O. Reg. 138/70 Made - Mar.23/70 Filed - Mar. 26/70 Gazetted - Apr. 4/70	DFSCRIPTION OF PROPERTY ASSESSED AC - Acres
O. Reg. 32/70 O. Reg. 33/70 O. Reg. 34/70 O. Reg. 35/70 O. Reg. 36/70 O. Reg. 37/70 O. Reg. 38/70 Made - Jan.28/70 Filed - Jan 30/70 Gazetted - Feb 14/70	-
O. Reg. 46/70 O. Reg. 48/70 O. Reg. 49/70 O. Reg. 50/70 O. Reg. 51/70 O. Reg. 52/70 O. Reg. 53/70 O. Reg. 54/70 O. Reg. 55/70 O. Reg. 56/70 Made - Jan. 30/70 Filed - Feb 5/70 Gazetted - Feb 14/70	-
O. Reg. 64/70 O. Reg 65/70 O. Reg 66/70 O. Reg 67/70 Made - Jan 30/70 Filed - Feb 11/70 Gazetted - Feb 21/70	-

NAME OF ACT: ASSESSMENT ACT

REGULATION NO. - DATE	REFERENCE CITATION
O. Reg. 120/70 Made - Mar 11/70 Filed - Mar 13/70 Gazetted - Mar 21/70	-
O. Reg 399/70 Made - Sept. 15/70 Filed - Sept. 17/70 Gazetted - Sept. 26/70	-
O. Reg. 435/70 Made - Oct 16/70 Filed - Oct 20/70 Gazetted - Oct 31/70	-
O. Reg. 541/70 Made - Dec 21/70 Filed - Dec 21/70 Gazetted - Jan 2/71	-
O. Reg 485/72	-
Made - Sept 27/72	-
Filed - Oct 2/72	-
Gazetted - Oct 21/72	-
O. Reg 423/72	-
Made - Aug 16/72	-
Filed - Aug 18/72	-
Gazetted - S ept 2/72	-
O. Reg 411/72	-
Made - Aug 9/72	-
Filed - Aug 11/72	-
Gazetted - Aug 26/72	-
O. Reg 370/72	-
Made - July 24/72	-
Filed - July 25/72	-
Gazetted - Aug 12/72	-
O. Reg 266/72	-
Made - May 31/72	-
Filed - May 31/72	-
Gazetted - June 17/72	-

NAME OF ACT: ASSESSMENT ACT

REGUALTION NO. - DATE	REFERENCE CITATION
O. Reg. 34/72 Made - Jan 24/72 Filed - Jan 31/72 Gazetted - Feb 19/72	- - - -
O. Reg 465/71 Made - Nov 2/71 Filed - Nov 4/71 Gazetted - Nov 20/71	Description of Property Assessed A C - Acres
O. Reg. 110/71 Made - Mar 9/71 Filed - Mar 11/71 Gazetted - Mar 20/71	- - - -
O. Reg 290/71 Made - June 30/71 Filed - July 12/71 Gazetted - July 31/71	- - - -
O. Reg 31/71 Made - Jan 19/71 Filed - Jan 20/71 Gazetted - Jan 30/71	- - - -
O. Reg. 10/70 Made - Jan. 2/70 Filed - Jan. 6/70 Gazetted - Jan. 17/70	- - - -
O. Reg. 257/70 Made - Apr. 27/70 Filed - June 10/70 Gazetted - June 20/70	Form Enumeration Questionnaire 5.(a) 20 acres

NAME OF ACT: ASSESSMENT ACT

REGUALTION NO. - DATE	REFERENCE CITATION
Regulation 57 R. R. O. 1970	
Regulation 58 R. R. O. 1970	Form 5.(a) ...20acres
Regulation 59 R. R. O. 1970	-
Regulation 60 R. R. O. 1970	DESCRIPTION OF PROPERTY ASSESSED AC - Acres
Regulation 61 R. R. O. 1970	-

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